SERIES 3—Vol. 1, No. 1 JANUARY, 1918

AMERICAN JOURNAL OF OPHTHALMOLOGY

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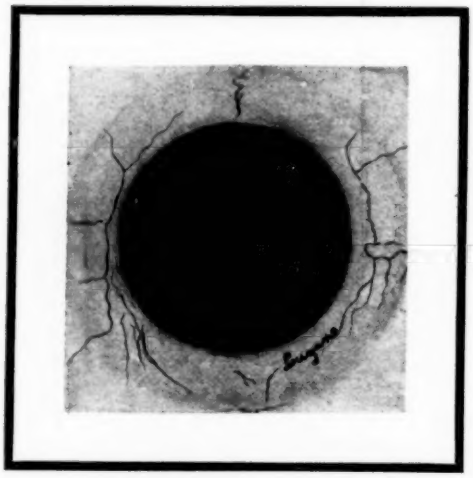
Annual Subscription Ten Dollars in Advance,
Single Copies One Dollar.

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY,
7 West Madison Street, Chicago, Illinois.



ESSENTIAL ATROPHY OF THE IRIS, FEINGOLD'S CASE.

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ESSENTIAL ATROPHY OF THE IRIS

MARCUS FEINGOLL, M. D.,

NEW ORLEANS, LA.

Report of a case from the Eye Department of the Touro Infirmary, New Orleans, La. The eye enucleated and studied in the Laboratory of the Medical Department of the University of Colorado. Histologic examinnation confirmed the clinical picture, demonstrated Schnabel's cavernous degeneration of the optic nerve and revealed unexpected changes in the retina. Illustrated with one colored plate and five microphotographs. (Read before the Colorado Opthalmological Congress, August 10th, 1917.)

Because of the rare clinical picture and the interesting histologic findings, the following case deserves recording.

Mrs. B. M., aged 37, dressmaker, called at the Outpatient Department, Touro Infirmary, March 1, 1917, on account of poor vision of her left eye and pain over it.

Closer questioning brought out the following unsatisfactory history: When a child she had measles; since that time the left eye appeared smaller and crossed to the nose; sight was fairly good until November 16, 1916. On that day severe frontal headache on the left side began and lasted for two weeks, with pain extending to the left side of face and accompanied by nausea.

Since then attacks of pain recurred frequently, but were much less severe, came more often in A. M. than in P. M. After the attack of November the eye turned to the temple and the sight was impaired, though she could see large objects. The sight gradually failed and now she can hardly see at all; she cannot do near work for any length of time because it brings on pain and discomfort in the left eye. The left eye never was red. Three years ago glasses were prescribed for her by an oculist who used no drops; was not told, at that time, of any defects. November, 1916, again saw the same oculist and was told that the iris of the left eye was torn loose and the eye would have to be enucleated. She, herself, had not noticed any particular change in the iris until November, 1916. (Inquiry from the oculist about his findings remained unanswered.)

V. O. D. 5/9; V. O. S. Doubtful light perception.

Retinoscopy: R. E. — 0.50 ⌒ — 0.50 cyl. ax. 90°; L. E. — 1.50 ⌒ — 0.75 cyl ax. 180°.

With above correction: R. E. V= 5/5; L. E. no improvement.

R. E. Anterior portion, media and fundus are perfectly normal. Pupil 3.5 mm. Tn.

L. E. is slightly turned out and up. A few enlarged episcleral vessels. Cornea shiny and perfectly transparent; no precipitations on posterior surface. Anterior chamber is fairly deep, about as in the other eye. The pupil is eccentric, nearer to the upper temporal limbus; it is irregularly quadrilateral with rounded angles; its vertical diameter is about 6.5 mm., the horizontal one about 5 mm. A trace of indirect light reaction. The iris is light brown, as in the other eye and shows several black areas in which all details of iris stroma are entirely absent

These areas vary in size and shape, from very small, like fine clefts between the fibers, to about one-third the size of the pupil. The largest black area begins at the nasal limbus, is sharply defined and extends to about the smaller iris circle; its longest vertical diameter is about 5 mm., the horizontal one about 3 mm. A small more or less round area is situated at the lower limbus, two narrow, long areas are at the upper limbus and a similar somewhat triangular one near the lower nasal limbus. On the temporal side a vertical, long, narrow, almost linear area in the iris is bridged over by fine horizontal brown threads of iris stroma. All these areas are situated in the region of the ciliary portion of the iris and only a few very small ones occupy the sphincter portion. In the balance of the iris stroma the trabeculae are possibly thinner than in the other eye. With oblique illumination and the binocular loupe some of these areas appear brownish black, of the same tint as the retinal pigment at the pupillary margin. These brownish black areas are: the linear one at the upper limbus, one in the lower nasal limbus, one at the lower limbus, and the vertical linear defect in the temporal portion of the iris. (The brown of these defects as well as of the retinal pigment at the pupillary edge in the accompanying picture has been exaggerated for the purpose of illustration.) All other areas are as black as the pupil itself, allow the anterior lens surface to be seen distinctly, and are, therefore, true holes in the iris.

Ophthalmoscopic Examination: A very striking picture is produced by the fact that several defects in the iris appear as accessory pupils which allow the light to pass through in the same tone of red as the pupil. These accessory "pupils" are fewer in number than the defects in the iris, and the places where they are missing correspond to the brownish black areas. Media are perfectly clear. Total, overhanging excavation of disc about of 3 to 4 D. T + 3.

On transillumination only the black areas show up bright red like the pupil, the brownish black areas being entirely impervious to light.

Wassermann reaction and physical examination negative.

With the Schiötz tonometer (novocain—cocain anesthesia): R. 20 mm. Hg.; L. 38 mm. Hg.

Application of eserin to L. E. reduced the tension to palpation without giving any comfort, and with no improvement of vision.

During the course of further observation the discomfort continued and patient insisted on enucleation, which was finally done under local anesthesia March 27, 1917.

HISTOLOGIC EXAMINATION.

The eye was fixed in Zenker's solution immediately after enucleation. After the customary hardening the eye was bisected in the equator and prepared for sections parallel to the horizontal meridian. Imbedding in parlodion. Lee's cedar oil method of dry cutting.[1]

Anterior portion: Complete series, each section 12μ.

Posterior portion: Nothing of interest having been seen with the ophthalmoscope, no serial sections were attempted. Only when examination of the individual sections discovered the interesting condition to be described below was an attempt made at reconstruction by mounting all sections of the particular region. Each section 12μ. Cross sections of the optic nerve.

Cornea: The epithelium consists of five layers; only in a small area in the upper nasal portion adjoining the limbus of three or four layers; otherwise no defects. Bowman's membrane, parenchyma and Descemet's membrane are entirely normal. The endothelial cells are few, swollen, and are apparently undergoing degeneration; the nuclei stain poorly and each is surrounded on the side toward the anterior chamber by a round colorless halo of protoplasm. The anterior chamber is deep and filled with granular coagulum which contains no formed elements excepting in the lower part; here a number of small round nucleus-like structures are seen which stain poorly with hematoxylin and bear a close resemblance to the nuclei of the endothelium.

Schlemm's canal can be seen in all sections, is wide open and contains blood.

Several sections show in this region a slight infiltration with lymphoid cells and only a few sections some slight pigment accumulation. The meshes of the pectinate ligament cannot be made out distinctly because of the dense adhesion of the iris root to the cornea.

Iris: The iris root is adherent to the cornea in all sections to the extent of 0.6 to 0.8 mm., in this way obliterating the angle of the anterior chamber. The defects seen clinically can be traced easily under the microscope in the whole series. The defects are of different degrees; some like the large one adjoining the nasal limbus comprise stroma and pigment epithelium, thus being true holes; others comprise only the stroma and leave the pigment epithelium entirely intact. In those places like the nasal one where the defect, clinically, seemed to extend to the limbus, the microscope shows a small stump of free iris of about 0.2 mm. projecting from the false angle. In some sections the defect in the pigment epithelium is slightly greater than the defect of the stroma. In the vertical defect on the temporal side of the iris one can see the pigment epithelium almost bare, with only a remnant of the iris stroma in the form of one or two fine strands of tissue in front of it. The iris stroma at the edges of all the defects is loose and not covered by any layer of cells; the meshes between the cells seemingly communicate openly with the defect itself and consequently with the anterior chamber; the whole arrangement bears close resemblance to the structure of the iris found around the crypts or at the pillars of a coloboma following an iridectomy. Only the nasal edge of the large hole in the iris shows a different structure; here the edge is rounded off, not teased out as in the other places, and is covered by single flat cells which apparently are a continuation of the cells covering the anterior surface of the iris. No posterior synechia is seen anywhere, not even in those places where the pupillary margin is nearest to the center of the original pupil. The pigment epithelium is thickened and puckered into folds, especially near the defects in the stroma. No ectropion of the pigment epithelium at the pupillary margin in any place.

In the ciliary portion the iris tissue is on the whole more dense and stains diffusely with eosin, the cells are closer together and the anterior limiting layer shows an accumulation of pigment cells; the sphincter portion, on the other hand, looks more spongy and loose, like the normal. The chromatophores are more or less rounded and show no processes. The blood vessels are remarkably numerous, especially in the ciliary portion of the iris, within the portion adherent to the cornea and in the small stump projecting from it. Some of the vessels show thickened homogeneous walls, but no appreciable decrease in lumen; these vessels are mostly found in the ciliary portion of the iris. In the sphincter portion, on the other hand, most of the vessels have thin, normal walls, and only here and there is one seen having hyalin and thickened walls.

In all sections the sphincter muscle appears normal, the bundles not being appreciably smaller; the seemingly wider separation of the bundles in some of the sections can possibly be the result of the direction of the section on the distorted pupil. The dilator can be seen in almost all sections where the iris stroma is present.

The anterior surface of the iris is covered with a single layer of cells, a continuation of the corneal endothelium; these cells are best seen in the false angle. In a few sections small lumps on the anterior surface of the iris consist of cells with deeply staining nuclei and slight amount of protoplasm, with an occasional pigment cell; some of these lumps are situated on the stump of the iris near the angle, others are nearer to the pupillary margin. The cells of these lumps can, in some sections, easily be seen to be derived from and continuous with the endothelial covering. Nowhere is any accumulation of lymphoid cells found within the iris; single plasma cells are seen only very occasionally.

The posterior chamber shows the same granular coagulum as the anterior chamber, but no formed elements. Lens capsule and lens are entirely normal; the epithelium of the anterior capsule pos-

sibly extends more toward the posterior pole than normally.

The ciliary body is atrophic, apparently more so on the temporal side; the muscle is thin, the processes are long, hyalin, and stain uniformly with eosin; the epithelium covering the tips of the processes is often devoid of pigment. A small cyst in the epithelium is seen on the temporal side. The major iris circle has thin walls, its lumen is wide and contains blood. No cellular infiltration is found in any place.

The vitreous body shows a small detachment in the posterior portion; the remaining space of the interior of the eye between the retracted vitreous and the retina is filled by an exudate which is granular and fine. A more dense and uniform exudate covers the inner surface of the nasal part of the retina and fills the excavation of the optic nerve. Where the exudate is granular it takes the eosin stain and looks like the exudate in the posterior and anterior chambers. Where dense the exudate stains much more deeply with eosin and looks more horny and homogeneous. A few small, round, cells so badly degenerated as to make identification impossible, are seen in the exudate lying in the glaucomatous excavation. The vitreous itself forms a more or less dense fibrillar network containing no cellular elements.

The choroid shows nowhere any cellular infiltration. The blood vessels and chromatophores are entirely normal. Here and there is seen a diffuse and uniform, but faint staining with eosin between the formed elements. The pigment epithelium is entirely intact. At the temporal margin of the disc are seen two small colloid bodies.

Retina: On account of the detachment of the retina in the upper temporal portion which occurred during the imbedding, the sections of that part of the retina are not absolutely horizontal and the consequent slight distortion is clearly visible. Traces of edema in the internuclear layer are seen as slight spacing out of fibers. Rods, cones, outer nuclear and inner nuclear layers are apparently normal with the slight exception mentioned below. The nerve fiber layer is rather thin on the temporal side, even less thick than on the nasal side. The ganglion cells are apparently in normal number and appearance on the nasal side. On the entire temporal side, on the other hand, the cells are greatly reduced in number and are entirely missing in an area which begins at the temporal margin of the disc and extends through 1.5 mm. in the direction toward the macula. On the temporal side of this area the ganglion cells suddenly reappear though never reaching the full quota of this region in the normal eye. This area extends in a vertical direction through at least 48 sections of 12μ each, equaling at least 0.576 mm. Its dimensions are, therefore, at least 1.5 x 0.576 mm. Corresponding to this area the inner nuclear layer contains fewer cells than the adjoining portion.

This area is further characterized by peculiar bodies found only here. They appear in different places in different sections; number from two or three to over thirty; are either arranged in one line or in two or three rows; are always occupying the place where the ganglion cells ought to be, but are here and there found as far as the inner nuclear layer. These bodies vary greatly in size, but all are much larger than the ganglion cells of this area in the normal eye. A number of measurements have been taken and a few examples are here given: 28 x 12μ; 30 x 30μ; 30 x 14μ; 44 x 24μ; 28 x 40μ. Some of these bodies show a long process which runs parallel with the nerve fibers and consequently with the inner surface of the retina and can often be traced for about 70μ. This process at its origin from the body is about 3μ thick and tapers to 1μ at its point. These bodies are all surrounded by a clear space which is bridged over by fine threads or ribs connecting the bodies with the fibers surrounding it; the bodies appear more or less homogeneous and show only a few very small vacuoles at the periphery; they contain in the center a nucleus-like structure which varies in shape and size. These "nuclei" are round and may have a diameter of 6μ; others are more oval, measuring 8x36μ; others again appear more lobulated and remind one of the nucleus of the leucocyte or have a marked resemblance to

a mitotic figure; it often appears as if more than one "nucleus" existed. These details can be seen best with the phosphotungstic acid hematoxylin stain. The bodies and their processes stain pinkish red with eosin, yellow with van Gieson, reddish with Mallory's connective tissue stain, reddish-blue with the phosphotungstic acid hematoxylin. The "nucleus" stains dirty red with eosin, blackish yellow with the Wiegert-van Gieson, a blackish red with Mallory's connective tissue stain and deep blue with the phosphotungstic acid hematoxylin. No structural details can be made out in the nucleus even with the oil immersion, in spite of the perfect fixation by the Zenker's solution.

The optic nerve presents a typical glaucomatous excavation, 1.2 mm. deep, filled with a dense coagulum containing a few fatty degenerated cells. The lamina cribosa is bulging backward typically; in front of it lies a small amount of reticular tissue as the only remnant of nerve and glial fibers. In the temporal part of the optic nerve immediately behind the lamina cribrosa is an area which attracts attention even of the naked eye because it appears lighter and much less dense. Its greatest dimensions are 0.88 mm. from right to left and 1.1 mm. anteroposteriorally; it extends through at least seventy sections of 12μ each, corresponding to a vertical diameter of 0.84 mm. It is oval on cross-section and its outlines are not strictly defined. This area is characterized by an entire absence of nerve fibers and contains only fine fibers forming a loose network with large clear spaces here and there. The central retinal artery and vein are wide open, have normal walls, and show only a slight amount of perivascular infiltration with lymphoid cells in some sections. The balance of the optic nerve shows somewhat thickened septa and rather numerous cross-sections of vessels.

REMARKS.

In the above description features found in all cases reported[2] will be recognized alongside with characteristics peculiar to this case alone. Some of these features demand further discussion: 1. The clinically clear-cut changes in the iris which were verified by the microscope: the partial defects affecting the iris stroma only, and the formation of true holes in the iris extending through stroma and pigment epithelium. 2. The clinical and histologic symptoms of glaucoma. 3. The changes in the optic nerve behind the lamina cribrosa: the cavernous degeneration of Schnabel. 4. The changes in the retina at the temporal side of the disc.

The history as well as the clinical and histologic examinations fail to find any cause for the peculiar atrophy of the iris in this case. There is no history of traumatism as in some of the cases, no history or clinical manifestation of any general diseases, like tuberculosis, etc., as found in other instances. It is doubtful how much value can be attributed to the statement that the eye—i. e., the palpebral opening—had been looking smaller since measles in childhood, if this statement is to be used to prove an inflammation at that time. The histologic examination certainly shows no process of such long standing, the whole picture rather bearing the stamp of one of comparatively short duration. Evidences of any inflammation that might have caused the changes in the iris are even less marked than in Wood's[3] case, and are limited to slight infiltration and pigmentation around Schlemm's canal. These and possibly other symptoms such as the changes in the corneal endothelium, the aqueous, humor, the vitreous body and the perivascular infiltration in the optic nerve can easily be explained in another way.

A certain feature in the histologic picture on the other hand is very prominent and might possibly contain an explanation for the changes in the iris. All the defects in the iris were situated in the ciliary portion of the iris, while the pupillary portion had remained fairly intact. At the same time changes in the blood vessels typical of degeneration were found almost exclusively in the remnants of the ciliary portion of the iris, while these changes were nearly entirely absent in the pupillary portion. Although the blood vessels of the two parts of the normal iris are apparently forming a continuous system, the smaller iris circle and its branches seem, in this case

at least, somewhat independent of the blood vessels in the periphery of the iris; it is also worthy of notice that the major iris circle from which all the blood vessels of the iris are derived, appeared normal in all sections. Neither the vascular changes nor the accompanying atrophy of the iris can be considered as the result of the glaucoma and the peripheral anterior synechia for the following reasons: Vascular changes of the iris, when occurring in glaucoma, are not limited to one portion of the iris only; further, when atrophy of the iris is the result of glaucoma, ectropion of the retinal pigment forms an almost constant part of the clinical and pathologic picture; because the atrophy of the iris in glaucoma is generally beginning at the sphincter portion of the iris, and lastly, because the atrophy of the iris of glaucoma only very occasionally extends through the whole thickness of the iris. The coincidence in this case of so many symptoms not usually found in glaucoma compels the only conclusion that these symptoms must be due to some other factor than the glaucoma. Could not, on the other hand, primary changes in the blood vessels based on some embryologic malformation explain all these symptoms? The region of the smaller iris circle is the point of attachment of the embryonic pupillary membrane and its numerous vessels. It is easy to assume that a disturbance of some unknown nature occurring at this particular region may have predisposed the vessels of the ciliary portion of the iris in such manner that they would undergo an early degeneration which, in turn, would lead to atrophy of the whole iris region so affected.

The clinical examination shows in this case, as in all others reported, glaucoma as one of the prominent symptoms. While the histologic examination fully bears out the clinical diagnosis it fails in this instance again to give an explanation of the mechanism how the glaucoma originated. Symptoms of a past inflammation leading to glaucoma are almost nil and while it is perfectly possible that an inflammation leading to glaucoma should pass off without leaving any trace behind, the histologic examination in this case offers no basis for such an assumption.

The changes in the optic nerve behind the lamina cribrosa, the cavernous degeneration of Schnabel, were also seen in Wood's case, the only other one examined histologically. This symptom was originally thought by Schnabel to be characteristic of and responsible for the glaucomatous excavation but is now admitted not to be pathognomonic of the disease. In this case the secondary contraction assumed by him as the cause of the glaucomatous excavation cannot be upheld: the histologic picture here shows distinct bulging backward of the lamina cribrosa with a rather big degeneration behind it and without any signs of shrinking of the tissue remnants. A peculiar characteristic of the present case is that this degeneration of the optic nerve is limited to the *temporal* region and the question of the relation of this symtom to the changes of the papillo-macular area naturally arises.

Atrophy of the nerve fiber and ganglion layers in the retina on the temporal side are a frequent symptom in glaucoma. But the changes limited to that small area on the temporal side of the disc need a different explanation, and it will be best to first analyze the significance of the peculiar bodies found in this area. On first glimpse these bodies impress one as ganglion cells though they are much larger than these structures; they are situated in the exact location of the ganglion cells, have a nucleus which stains poorly and shows no structural details, are surrounded by a clear pericellular space and seem connected with the surrounding fibers by thin ribs.

In the question as to the nature of these bodies only two conditions must be considered: varicose or ganglionic nerve fibers, also called cytoid bodies, and certain changes found in the retina of the rabbit by Schreiber and Wengler.[4]

The varicose nerve fibers found so frequently and under such varying conditions have, since first discovered, led to a great deal of controversy and were at first looked upon as ganglion cells until the explanation of H. Mueller as to their nerve fiber nature was definitely accepted. Of the many pathologic

conditions under which varicose nerve fibers are seen in the retina not one is present in the case under discussion. There were no hemorrhages, no exudates, no vascular disturbances, no wounds, no swelling of the optic nerve. This certainly must, to some extent at least, militate against the interpretation of these structures as ganglionic nerve fibers. In addition it must be emphasized that these bodies all correspond in their position to the position the ganglion cells should occupy and that what was left of the nerve fiber layer passed over them without this whole region showing any tumor-like formation as is usually seen around varicose nerve fibers.

All accessible illustrations of varicose nerve fibers differ greatly in many characteristics from the bodies found in this case. Only the figure published by Leber[5] of varicose nerve fibers in a case of partial thrombosis of the retinal vein shows bodies greatly resembling those found in the present case, but the picture in question contains in addition large foci of unmistakable and typical varicose nerve fibers. The text and the description of the cut contain no mention of these bodies and it must be inferred that they are to be considered a part of the pathologic condition. In the present case these bodies alone are present and all other characteristics of and conditions accompanying ganglionic nerve fibers are entirely absent. The nature of these bodies is, therefore, still questionable. In connection with this it must be mentioned that the nature of "ganglionic nerve fibers" as being true nerve fibers has been questioned even since the days of H. Mueller.

Schreiber and Wengler, after injection of Scarlet R. oil into the anterior chamber of the rabbit found the ganglion cells in the retina swollen; their chromatin lumps were fewer, broken up and staining poorly, the nucleus often appeared irregularly shaped and its staining properties had been lost. Often they found such protoplasmic mass had assumed double the size of the normal ganglion cells of the rabbit; all this they considered as undoubted symptoms of degeneration. In the atrophy of the retina following experimental severing of the ciliary arteries Schreiber[6] found the ganglion cells often displaced into the outer layers of the retina, some even in contact with the lamina vitrea. After injection of atoxyl into the vitreous of the rabbit, Igersheimer[7] found similar displacement of the ganglion cells into the inner nuclear layer.

According to Nissl, as quoted by Schreiber and Wengler, the pericellular spaces and the "Spangen" or ribs connecting the cell-like structure with the surrounding fibers are to be looked upon as symptoms of shrinking by the fixation fluids and are, when found in the central nervous system, characteristic of ganglion cells only.

The cell-like bodies found in the present case answer excellently to the description just quoted, and the experiments mentioned show that ganglion cells will be found displaced under different conditions. These bodies may, therefore, be considered as ganglion cells having undergone certain degenerative changes. This view is further strengthened by the absence of ganglion cells in this whole neighborhood, a fact which can be interpreted that the ganglion cells having degenerated utterly the resulting detritus disappeared entirely by absorption. The cells we see must, therefore, be looked upon as the last remnant of the destructive process that went on in this region. A destruction entirely limited to the ganglion cells of a certain area is never found in pure glaucoma and is an unusual picture at all times. To explain this, one can assume that a vascular disturbance limited to this area produced these changes, or that some toxin affected the ganglion cells of this most sensitive area. There is no evidence of any vascular disturbance in the central retinal vessels and their ramifications; all vessels are wide open and show normal intima. A toxic condition on the other hand, affecting the papillomacular area, this most vulnerable because highly specialized region, can be assumed much easier. But if such toxic disturbance occurs it ought to affect all the ganglion cells of the region from the disc to the macula; in this case the destruction of the ganglion cells is limited to a part of that area only. And if it be

argued that the process was farther advanced near the disc and that it would later extend toward the macula, such assumption would be just the opposite from what one would have expected because of the greater vulnerability of the macula proper.

The destruction of the iris tissue must have set free substances which acting in a rather irritating manner on all structures of the eye could have produced changes in the corneal endothelium, in the aqueous humor and the vitreous body; it possibly may have also caused the perivascular infiltration in the optic nerve and even the changes in the retina. The retinal changes of this limited area would then be of a similar nature, as those reported by Schreiber and Wengler in their Scarlet R. experiments, the result of irritation and destruction of the retina evoked by the influence of toxins. Whether the peculiar shape of the nuclei is to be interpreted as an attempt of the cells at mitosis, as found by these authors, cannot be decided in the present case. The resemblance in the phosphotungstic acids preparations, to mitiotic figures was certainly very striking and commented upon by all who had seen them.

That much granted, the question still remains open how this assumed toxemia should have had a selective action on the ganglion cells of this limited area. It is possible that some congenital inferiority so reduced the resistance of this area to the toxins that an early destruction took place here, while the other more resistant portions remained still unaffected. With the longer duration of the process these other parts would possibly succumb later on.

In conclusion it must be said that this case offers no positive explanation for the peculiar clinical entity of essential atrophy of the iris, although some features of the histologic picture could be interpreted that congenital vascular disturbances in the neighborhood of the smaller iris circle may have induced the changes in the iris.

The case, further, gives no explanation for the mechanism of the glaucoma, which is found in all these cases.

The peculiar changes found in the retina are still more difficult to interpret because of the doubt as to their classification, but they must be thought to be the effect of toxins freed by the destructive process in the iris. The last word in this, as in those other questions, is only to be expected with accumulated experience.

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LUXATION AND AVULSION OF EYEBALL DURING BIRTH.

HARRY FRIEDENWALD, M. D.,

BALTIMORE, MD.

Brief abstract of twenty-nine cases from the literature; with report of a case of complete luxation, with operative restoration of the globe and complete recovery. The result after two years is shown by the illustration.

In 1905 Bruno Wolff published a monograph on the "Injuries of the Eyes of Infants During Birth" (Beiträge zur Augenheilkunde, Hirschberg Festschrift, 1905, p. 311). These cover a wide range from such slight injuries as produce retinal hemorrhages, to such severe ones as complete separation of the eyeball from the orbit. The classification of injuries is made according to whether birth was spontaneous or instrumental and according to the presentation. Among the cases he has collected there are some of luxation, and some of evulsion of the eyeball. In luxation the eyeball has been forced through the palpebral fissure and lies in front of the eyelids. In evulsion the eyeball is torn out of the orbit. Birch-Hirschfeld reduces Wolff's cases under these headings to fifteen. These are the cases that are given in the accompanying list, together with three additional ones collected by Birch-Hirschfeld.

CASES FROM SPONTANEOUS DELIVERY.

Case 1. Hoffman (Monatsch. f. Geburtsch., v. 4, 1854) reports a case where the right eye was torn out of the socket, hanging by only the inferior rectus. The mother had received a large dose of ergot. In a subsequent delivery with forceps a similar accident occurred (see Case 15). The mother died after her fourth delivery, and a post-mortem examination showed abnormal pelvic measurements with a very prominent and sharp-edged promontory.

Case 2. Bock (Centralbl. f. pr. Augenh., 1902, p. 12). Difficult labor. Right eye in front of lid, conjunctiva torn, cornea hazy, muscles of eyeball torn. Eyeball replaced, but panophthalmitis set in and infant died. Bock was of the opinion that the orbit had been mistaken for the rectum and injured by the examiner's finger.

Case 3. De Wecker (Ann. d'Ocul., v. 116, 1896). The same mistake as mentioned above occurred, through the pressure of the examiner's finger, and at birth the left orbit was empty.

Case 4. Wicherkiewicz (Postep. ocul., 1904). Difficult labor. Right eye found in front of lids, held by the external rectus alone. The eye was removed.

CASES FROM FORCEPS DELIVERIES.

Case 5. Redemans (Ann. d'Ocul., v. 27, 1852). High forceps. Two hours after birth, right eye in front of lids. Marked hemorrhagic infiltration of lid. Panophthalmitis.

Case 6. Snell (Trans. Ophth. Soc., United Kingdom, 1903). High forceps. Left eyeball torn out of orbit hanging by shreds of tissue. Marks of forceps above left orbit. Partial facial paralysis.

Case 7. Thomson and Buchanan (Trans. Oph. Soc., United Kingdom, 1903). High forceps. Left eye lying on cheek, held fast only by conjunctival tissue and the external rectus. Deep impression by forceps over the frontal and parietal region. Mother, aged 38, primipara, contracted pelvis. Very large fetal head. Symphysiotomy and repeated applications of forceps required.

Case 8. Dittrich (Wien. klin. Woch., 1892). High forceps. Luxation of right eyeball, lower lid torn at inner canthus, all muscles excepting external and internal recti torn. Cornea cloudy, fracture of frontal bone. Infant died.

Case 9. Maygrier (Leçons de Clin. Obst., 1893). Forceps. Eye completely severed by fragment of bone from fractured roof of orbit. Child died.

Case 10. Shukowski (From Mels

Jahresb., 1902). Forceps. Eyeball hanging on cheek. Fracture of roof of orbit with orbital hemorrhage. Infant died of meningitis.

Case 11. Coccius (Leipzig, 1870). Luxation without apparent tearing of muscles. Reposition unsuccessful. Child died in 14 days. P. M. showed fracture of orbital roof with dislocation of bone fragments.

Case 12. Sidler-Huguenin (Correspondezbl. f. Schweiz. Aerzte, 1903). Patient an adult with history of forceps delivery. Left eye luxated in front of lids. Eye blind from optic atrophy and retinal lesions.

Case 13. Steinheim (Centr.f.Augenh., 1879). Forceps. Marked impression on left frontal region. Left eye in complete luxation. Cornea hazy. Eye replaced, followed by panophthalmitis and phthisis bulbi.

Case 14. Beaumont (Trans. Oph. Soc. U. K., 1903). Luxation. Eyeball replaced. Transient corneal opacity. Forceps delivery. The blade of the forceps had acted like the speculum used in dislocating the eyeball in the operation of enucleation.

Case 15. Hofmann (same patient as in Case 1). Low forceps. During attempt to unwind cord caught around the neck, the eyeball glided out between the fingers of the operator. Child died during first day. Hemorrhage intracranial and fracture of orbital roof on both sides.

Case 16. Zangarol (Thesis, Paris, 1864). Low forceps. Complete avulsion. Eyeball found among bed linens. Fracture of roof of orbit.

Case 17. Gueniot (Rec. d'Opht., 1875). Forceps. Complete avulsion, all muscles torn off as well as optic nerve. Child died in three hours. Fracture of roof of orbit and outer wall.

Case 18. Gad (Ophth. Rev., 1906). Forceps. Narrow pelvis. Eyeball held only by fragments of conjunctiva and bits of muscles. Optic nerve severed; fracture of roof of orbit.

Case 19. Eskenarzi (Constantinople, 1904, note in Nagel Jahr.). Luxation. Details not accessible.

Case 20. Bugge (Norweg. Tidskr., 1906, see Nagel Jahr., 1907). Right eye complete luxation. Labor not difficult. Eyeball replaced. Child died within 24 hours.

Case 21. Hermitte and Salva (Dauphine, 1906, see Nagel Jahr., 1906). Spontaneous luxation of eye following application of forceps in contracted pelvis.

Case 22. Fage (Arch. d'Opht., 1907) saw an infant three days after birth: Complete luxation of eyeball; cornea dry and exfoliated. Reduction of luxation by external canthotomy; after six months large leucoma. In this case, no forceps had been used in delivery.

Case 23. Thomson and Buchanan (Ophthalmoscope, 1907). Difficult forceps delivery, eyelid torn, internal rectus scarred, luxation of eyeball.

Case 24. Turnbull (Brit. Med. Jour., v. 2, 1909). Contracted pelvis, long labor. High forceps. Right eye found on cheek, optic nerve severed. No marks of forceps. Eyeball removed and child recovered.

Case 25. Donaldson (Brit. Med. Jour., v. 1, 1910). Forceps delivery. Left eye lying on cheek and was replaced. Child seen when three years of age, eye appeared normal and sight good.

Case 26. Mills (Brit. Med. Jour., v. 1, 1910). Forceps delivery. Right eye lying on cheek was replaced, but child was dead.

Case 27. Kraus (Muench, med. Woch., 1913). Contracted pelvis, forceps delivery. Right eyeball luxated and replaced. Subsequent enucleation found necessary, when it was found that the optic nerve and all the muscles except the obliques had been severed.

Case 28. Polliot (Clin. Opht., 1914. Reviewed in Ophth. Year Book, v. 11) reports a case in which the eye of the infant was completely enucleated by the finger of the midwife, who was under the impression that she was dealing with a breech presentation and exploring the anus.

Case 29. Goldwasser (Beitr. z. Geburtsch. and Gyn., 1914) reports a medico-legal case in which Prof. Doederlein was called as expert. Avulsion occurred during instrumental delivery and the eyeball was found in the placenta.

AUTHOR'S CASE.

The writer desires to report the fol-

lowing case which came under his observation:

Case 30. On August 25, 1913, he was called to see a female infant which had been born one and a quarter hours before. The attending physician stated that the fetal head had been in occipito-anterior position, that labor had been very difficult with a rigid os, and that after a long wait he had been obliged to apply high forceps. At birth, he noted that the left eye was exposed, and he feared that there was congenital absence of the eyelids.

On examination, the writer found a deep impression made by the forceps over the left frontal region and reaching down to the orbit. The left eyeball was completely luxated, but appeared otherwise normal; the eyelids were closed behind the eye.

Efforts to reduce the eyeball by gentle pressure and by means of a lid elevator were wholly unsuccessful; the palpebral fissure was too small. An incision was therefor made at the outer canthus and then reduction was easy. Sutures were placed to close the incision, but the eye was not otherwise dressed. The sutures were removed in a few days. On Sept. 29, the eye appeared normal.

On November 8, 1915, the child was examined carefully, when it was a little over two years of age. The eyeball appeared quite normal. The eyegrounds were healthy, there was no evidence of atrophy of the nerve or of lesion to the retina. The ocular movements were perfect and such tests as could be made, indicated that the sight was good. A photograph of the child made at this time is seen in Fig. 1.

The favorable outcome of this case makes it quite exceptional, and is in part due to the early reposition of the eyeball, within two hours of delivery,—and before there was desiccation and clouding of the cornea.

The marks of the forceps in this case made it evident that the luxation was produced as suggested by Beaumont, just as it is brought about by the speculum during enucleation.

The frequency of luxation and evulsion during birth is difficult to determine with accuracy. The accident is undoubtedly rare in spontaneous delivery. Birch-Hirschfeld (Graefe-Saemisch Handbuch, 2nd Ed., v. 9), points out however that while more frequent in instrumental delivery, the most severe cases have occurred when no forceps were used. In several of these cases, however, the injury was due to the finger of the examiner, who mistook the orbit for the rectum.

In a number of cases the infants die from the severity of the head injury. In some cases the eyeball, after reposition, was destroyed by panophthalmitis. There are few cases in which the eye

Fig. 1.—Friedenwald's case of luxation of eye ball during birth. Patient more than two years old showing complete recovery.

was saved, and in these there were corneal opacities. The case reported by the writer is an exception to this rule.

The subject is comprehensively dealt with not only by Wolff and Birch-Hirschfeld who have been cited, but also by Wagenmann in the chapter on injuries of the eyeball (Graefe-Saemisch, 2nd Ed., v. 9). They advised that, when reposition of the eyeball is considered, any fragments of bone due to fracture of the orbit be first removed. If necessary the Kroenlein operation should be performed to remove them or collections of blood which interfere with reposition. He also emphasizes the necessity of canthotomy.

The subject has also been discussed by obstetricians. Stump (Winckel's Handbuch, v. 3, p. 491) considers the responsibility of the obstetricians. Goldwasser (Beitr. v. Geburtsch. und Gyn., v. 63, p. 1423), declares that the obstetricians should not bear any blame when forceps have been used.

ANEURISMS OF THE RETINAL ARTERIES

BY

J. ELLIS JENNINGS, M. D., F. A. C. S.

ST. LOUIS, MO.

Description of a case with colored plate showing the ophthalmoscopic appearances presented.

Mr. T. K., aged 21, had defective vision of the left eye and was referred to me Jan. 12, 1917, by Dr. W. F. McNary of East St. Louis. The patient first noticed this defect about two months ago and said it could not have been longer for the reason that he had played ball all summer and while at bat had to see the ball with his left eye as it came from the pitcher.

The young man is short and stockily built and appears in perfect health. He has a younger brother aged 14 who is a typical albino.

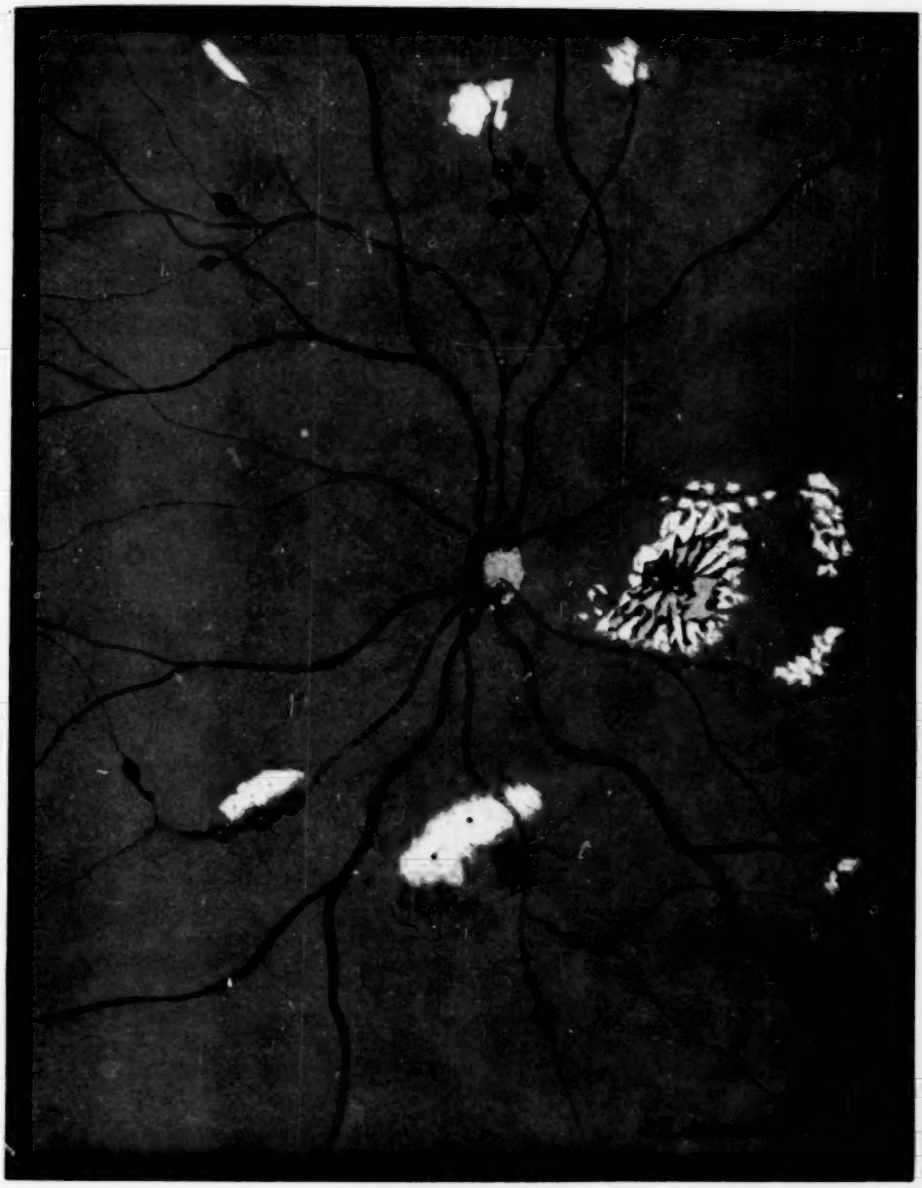
PHYSICAL EXAMINATION. The urine shows no trace of sugar or albumin. There is a slight hypertrophy of the heart but no murmur. The blood pressure is 135. The Wasserman reaction is negative. Vision of the right eye is 6/6; that of the left eye 3/60. The defect of vision is central, the scotoma covering 10 degrees on all sides of the macula lutea.

OPHTHALMOSCOPIC FINDINGS. The right fundus is normal in all respects. The left fundus presents a remarkable picture. (See Pl. IV.) The optic disc is normal. In the macular region is a large collection of dots, spots and lines of brilliant white arranged in a circle around the macula lutea. A short distance on the temporal side are more white dots and spots arranged in a semicircle. The appearances just described suggest an albuminuric retinitis or a retinitis circinata. Near the disc the retinal veins are of normal size but further on the lower ones enlarge suddenly to twice their normal size; while those above narrow almost to threads and then abruptly widen again. The extraordinary character of the picture is evident as the course of the retinal arteries are followed. The artery going directly downwards passes over a soft white, cloud-like opacity with small hemorrhages below it, and as it crosses an old hemorrhage gives off a fine branch at the very beginning of which is seen a small aneurism.

Just below this point on another branch are five aneurisms—two small and three large ones, and on the main stem one small and one large one. An artery running down and out below the macula region has a small aneurism on a branch and a large one on the main stem. The inferior nasal artery has four large and one small aneurism. Just above the three larger ones is a soft white opacity. Far up in the superior portion of the fundus on branches of the superior nasal artery are two large aneurisms. On a branch of the superior temporal artery is a large aneurism near three small hemorrhages, and above these are three soft white patches in the retina lying beneath the small arteries.

In all there are eighteen aneurisms, the larger ones having a bright central reflex. The difference in appearance between a hemorrhage and an aneurism is well shown in the upper portion of the fundus.

The patient was under observation for three months without noticeable change. On Oct. 11, 1917, nine months after the first observation, the patient called at my request for a final examination before closing this report. The changes noted were as follows: the white spots and patches in the macula region are fewer in number and the radiating figure is much



ANEURISMS OF THE RETINAL ARTERIES JENNINGS' CASE.

less marked. Extending out in both directions just below the disc is a long band of small white dots that I had not observed before. The first and second aneurisms on the inferior nasal artery have coalesced into a sacculated or sausage like enlargement. The small aneurism on the first branch of the artery running downward is much larger than it was and several of the aneurisms below this point are concealed in a whitish exudation.

The etiology of this rare condition is obscure. Probably it is the result of local inflammation and degeneration of the walls of the retinal vessels.

PRIMARY SYPHILIS OF PALPEBRAL CONJUNCTIVA

BY

EDWARD E. MAXEY, M. D.

BOISE, IDAHO.

Report of a case affecting the inferior fornix; with tabulation of the cases of chancre of the lids and conjunctiva reported since January, 1900, with bibliography.

A casual examination of the literature convinced me that chancre of the conjunctiva was by no means a common condition, which prompts me to report a case occurring in my practice recently, and also to give you the benefit of my survey of the literature on this subject. For obvious reasons I have not attempted to search the literature farther back than January 1, 1900.

According to Ginzburg (28) the first reported case of primary lid chancre was reported by Ricord in 1850. Many cases have been reported since then, but just how many I am unable to determine from the literature and help at my disposal. I know of no one who has attempted to make a complete compilation of all recorded cases of eye chancre, and those giving any extensive compilation vary greatly in their estimates of the number of cases reported.

In 1904, Terrien (80) made the statement that there were at that time scarcely more than twenty cases of conjunctival chancre known. Ginzburg (28), in 1910, was able to find in the Russian literature alone about 210 cases of primary lid chancre and 27 cases (28 including case reported by him at that time) of primary syphilis of the conjunctiva. In 1915, Finlay (19), in the literature at his disposal, was able to find about 100 cases of palpebral syphilis, and from different writers the total summing up of cases, he said, seemed to be near 500. Wolfrum and Stimmel (77), in 1910, report two cases of primary syphilitic affection of the conjunctiva and make the claim that their cases make a total of 71 cases of conjunctival chancre reported.

Spratt (71), in 1913, reports a most interesting and rare case of lues of the bulbar conjunctiva. In his review of the literature he was able to find only 21 cases of lues primarily affecting the bulbar conjunctiva, his own case making 22. Of these only three were located at the limbus. I have been able to add 14 additional cases of bulbar chancre to those cited by Spratt.

Quoting from Rouvillois (63), Spratt says the relative frequency in which the structures of the eye may be primarily involved are: (1) the lid margin, (2) skin of lid, (3) palpebral conjunctiva, (4) culdesac, (5) bulbar conjunctiva (scleral portion, inner angle and caruncle), (6) limbus and cornea. If we keep in mind the fact that from six to seven per cent (Spratt) to nine or ten per cent (Fournier, cited by Spratt) of all primary lesions are extragenital, and, further, that in frequency of attack the eye ranks after the lip and finger (Alter) (1), or after the lip, breast, mouth, finger, hands and tonsils (Muncheimer, cited by Alter), with chancre of the culdesac or fornix ranking fourth in frequency of the eye chancres, we may arrive at a fairly accurate idea of the relative infrequency of primary lues of the fornix.

In the literature for the past 17 years I have been able to find only three cases of chancre of the inferior fornix (Mathewson) (47), Wolfrum and Stimmel (77), and Suda (72), and three of the superior fornix (Fischer-Galati) (20), Ormond (52) and Pannunzio (53) reported. There may be others among those classified as "indefinite," where the title is obscure or the article not available for review, but probably not many are improperly classified.

My patient, a dentist, age 23, unmarried, came to me October 3, 1916, with, as he explained, "a badly infected eye," and the following history was elicited: On September 5th he gave the anesthetic for a doctor associate who was doing a tonsillectomy on a young woman of easy virtue, several times assisting in swabbing out the throat and mouth of patient. Patient has an indistinct recollection of rubbing his eye at completion of operation, but he does not remember that the patient coughed into his face, but this might have happened.

On or about the 25th of September he noticed an itching sensation in right eye and the following morning there was a slight redness of conjunctiva which continued for five or six days without other noticeable symptoms. Then was noticed a slight mucopurulent discharge, sufficient to make it an appreciable effort to open the eye of mornings. About this time he also noticed a slight soreness and foreign-body sensation in the eye, and from day to day the redness increased, the conjunctiva became edematous, the lower lid more and more swollen, and finally the preauricular and submaxillary glands began to enlarge and become tender.

Prior to consulting me the treatment had been frequent irrigations with boric acid solution, cold compresses, and one application of nitrate of silver solution, strength not known, immediately neutralized with salt solution.

The patient's personal and family history were negative. On his first visit I found the lower lid greatly swollen and indurated, the palpebral and bulbar conjunctiva deeply congested and chemotic, fully half the cornea being covered by the overhanging edematous conjunctiva. The upper lid was moderately swollen but not indurated, the cornea was clear and unaffected, and the media, iris and fundus were unchanged. The right preauricular gland was as large as a small hen-egg, and the submaxillary and subauricular glands were almost as large, and all were tender on palpation.

On everting the lower lid I found a shallow ulcer, 4 by 8 mm in area, at juncture of middle and external thirds of deepest portion of inferior fornix, limited entirely, however, to the palpebral conjunctiva. The ulcer was covered with a dark grayish membrane. There was a limited amount of photophobia and lacrimation, a slight mucopurulent discharge, and pressure elicited a moderate degree of soreness in the indurated lower lid, but there was little or no pain in the lid or indurated glands if undisturbed. The temperature and pulse were normal. Smears from surface of ulcer and neighboring conjunctiva showed no pathologic organisms, but the spirochetes were not specifically searched for at this time.

The above history as to probable method of infection was not obtained until after he had been under observation in hospital for about a week, during which time the ulcer was thoroughly cauterized, but there had been no response to treatment during this time, and it was not until this time that I began to strongly suspect we were dealing with a chancre. Scrapings from the ulcer area were again examined, this time particularly for spirochetes, but the laboratory report was again negative, and October 12 Wassermann was also negative. On October 19 a second Wassermann was reported "doubtful," but the third Wassermann, made November 2, was three plus positive, and on this date also the secondary symptoms began to appear on the skin and in the throat, with loosening of hair of scalp and eyebrows.

All doubt as to diagnosis was now cleared up and on the following day salvarsan was administered intravenously, followed by mercurial rubs and other antiluetic treatment. Within 48 hours after administration of salvarsan the conjunctiva began to clear up, the induration of lower lid and glands gradu-

ally receded, and the secondary symptoms soon disappeared entirely. After three weeks of specific treatment the patient passed from observation. The eye at this time was not entirely normal, there being still a slight amount of induration in lower lid at site of healed chancre, some hyperemia of conjunctiva, and the glands though very markedly reduced were still palpable. I know nothing of his subsequent history but presume that he is under the care of his associate physician.

The fact that the specific organism of syphilis was not demonstrated in the palpebral lesion is probably due to the previous cauterization or, possibly, to faulty technic. A thorough search was made for other possible points of invasion but the genitalia and all other parts of the body, except the eye, were entirely free of suspicion. This, with the specific character of the eye lesion, the adenopathy, the characteristic throat and skin lesions, the falling hair, and the final three plus positive Wassermann, make the diagnosis, in my opinion, unquestionable.

The cases of chancre of the eye found reported in the literature since January 1, 1900, are given below. The figures give the footnote references to literature, then follows the name of author and part of eye affected:

Reporter.	Location.
1. Alter	Conjunctival, lower lid
2. Abramitzew	Eye, indefinite
3. Aubineau	Conjunctiva, indefinite
4. Balzer, Boyé and Condoure	Conjunctiva, upper lid
5. Bielski, G.	Conjunctiva, upper lid
6. Botteri	Plica and tarsus
7. Bourgeois	Bulbar conjunctiva
8. Cameron	Bulbar conjunctiva
9. Cange, A.	Lid, indefinite
10. Cauvin, P.	Lid
11. Collins, E.	Lid
12. Dandois	Bulbar conjunctiva
13. Danlos and Dehévain	Lid
14. Davis, A. E.	Lid
15. DeSchweinitz, G. E.	Conjunctiva and cornea
16. Del Castillo Quartiellers	Lid
17. Duboucher	Palpebral conjunctiva
18. Dmitrieff	Lid
19. Finlay	Lid, both ext. and int. canthi.
20. Fischer-Galati	Superior fornix
21. Forshaw, W. J.	Conjunctiva
22. Fromaget, H.	Bulbar conjunctiva, 3 cases
23. Frugiuele, C.	Conjunctiva
24. Fumagalli, A.	Border of upper lid
25. Galati	Conjunctiva of upper lid
26. Gaucher and Audebart	Upper lid
27. Gellé	Double conjunctiva and nasal fossa
28. Ginzburg, J.	Conjunctiva and lower lid margin
29. (?) Cited by Ginzburg, J.	Upper lid
30. Gilbert	Inner angle
31. Ginzburg, T. I.	Lid
32. Grandclement	"Large angle" of eye
33. Gutzeit	Bulbar conjunctiva
34. Hallopeau and Trastour	Lower lid following a cut
35. Hallopeau and Raillet	Lower lid
36. Koupliansky	Palpebral conjunctiva
37. Krajsky	Upper lid
38. Leoz, G.	Lid
39. Livingstone and McGregor	Lid
40. Luzzati	Bulbar conjunctiva
41. Maggi, F.	Lid
42. Matsuoka	Conjunctiva
43. Marbaix	Lid
44. Marlow, F. W.	Conjunctiva
45. Maslennikoff	Bulbular conjunctiva at limbus
46. Maslennikov	Lower lid
47. Mathewson.	Conjunctiva, inferior fornix
48. Merle, P.	Conjunctiva
49 Mewborn, A. D.	Conjunctiva of lower lid
50. Mine	Conjunctiva of upper lid
51. Morax	Bulbar conjunctiva
52. Ormond, A. W.	Retrotarsal fold, upper lid
53. Pannunzio	Superior fornix
54. Pandelescu	Conjunctiva
55. Passetti, G.	Multiple of lid
56. Pelissier, R.	Bulbar conjunctiva
57. Poli, G.	Upper lid
58. Pons y Marques	Bulbar conjunctiva
59. Posey, W. C.	Lid
60. Rollet, E.	Bulbar conjunctiva
61. Rollet and Grandclement	Lower lid, infant, probably congenital
62. Rosenbaum	Ciliary border, both lids
63. Rouvillois, H.	Bulbar conjunctiva
64. Sans Blanco	Bulbar conjunctiva
65. Sauvineau	Bulbar conjunctiva
66. Seeligsohn	Lid
67. Shetskiy	Lower lid
68. Shoemaker, W. T.	Lid
69. Snitowsky	Conjunctiva, upper lid
70. Sourdille, G.	Bulbar conjunctiva
71. Spratt	Bulbar conjunctiva at limbus
72. Suda	Lower fornix
73. Treacher Collins	Conjunctiva
74. Tschistjakow	Upper lid, eye angle
75. Vasquez, E. L.	Bulbar conjunctiva
76. Villemonte de la Clergerie	Bulbar conjunctiva
77. Wolfrum and Stimmel	Conjunctiva, inferior fornix
Second case	Conjunctiva, indefinite
78. Yudin, K. A.	Palpebral conjunctiva
79. Zirm	Eyelids

Summarizing these cases we find that

of the 82 cases reported in this period, 49 may be classed as conjunctival chancres, 27 as lid chancres, 4 are found at the canthus, 1 as chancre of eye, location not known, and 1, perhaps, should be excluded entirely as it may possibly have been congenital. Of the conjunctival chancres, 5 were of the upper lid, 3 of superior fornix, 3 of lower lid, 3 of inferior fornix, 3 of lid, but location indefinite, 21 of the bulbus, 1 of plica and tarsus, and 10 were indefinite as to part of conjunctiva affected. Of those classed as lid chancres, 4 affected the upper lid, 4 the lower lid, 2 the ciliary border and 17 were of indefinite location. All of the 4 cases of angle chancre were at the inner canthus, though Finlay's case of double chancre affected both canthi.

In the preparation of this paper I have been impressed with the value to students of our specialty of the Ophthalmic Year Book, and also with the fact that those who write papers or report cases should use more care in selecting their titles. Chancre of the eye, or even chancre of the conjunctiva, of course, is getting close, but such titles are rather discouraging to one who is trying to tabulate lesions of the different structures of the eye. There are too many "indefinites" in the above tabulation to permit my effort being classed as a complete compilation for the period named.

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CYST OF DURAL SHEATH OF OPTIC NERVE

WILLIAM C. BANE, M. D.

DENVER, COLO.

Report of case, including operative removal. Subsequent result, and histologic study of the removed tissue. With illustrations showing the condition before and after treatment. Read before the Colorado Ophthalmological Congress, August 9th, 1917.

On May 25th, 1914, L. B., a lad of six years, was brought to me with a history of having had frequent attacks of frontal headache during the previous six weeks.

Vision with the right eye was normal, media clear, fundus healthy. There was one diopter of hyperopia. Vision with the left eye was almost nil, the patient, at times seemed to see movement of a hand 40 cm. from the face. Media clear. The optic disc decidedly atrophic and of pearl-white color. Hyperopia = 3D. Left eye-ball unsteady in its movements. Correcting lenses were ordered and the high frequency current used on the eye at intervals for about three weeks, when the treatment was discontinued.

Patient returned Nov. 18th, 1916, when there was marked left exopthalmus. The eye-ball protruded 5 mm. forward, downward and inward beyond the plane of the right eye. By measurement with the exophthalmometer, the right eye was 17 mm. and the left eye 22 mm. out from the planes of the outer orbital margin. Movement of the left eye upward and outward was almost nil. Ophthalmoscopic measurement of the left eye was then +6D., being double that revealed 2½ years previously. Tumor of the optic nerve was suspected and operation advised. An X-ray picture did not reveal any evidence of sinus involvment, or solid tumor in the orbit.

On Dec. 5th, 1916, under general an-

esthesia, a vertical incision about 30 mm. in length and 5 mm. external to the cornea, was made through the conjunctiva and capsule. The external rectus was elevated on a hook, and black silk

FIGURE 1.
Cyst of Optic Nerve Sheath. Bane's case. Front view before operation.

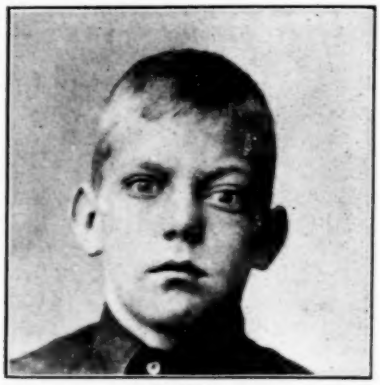

FIGURE 2.
Same case nine months after operation.

sutures passed through the muscle near its attachment. The muscle was then severed and drawn outward. Dissection backward, close to the eyeball, soon brought into view a smooth, round mass, 12x18 mm., that appeared to be cystic. The growth was firmly attached to the sclera around the optic nerve entrance to the eye-ball, and enveloped the nerve for about 18 mm. toward the optic foramen.

FIGURE 3.
Cyst of Optic Nerve Sheath. Bane's case. Side view before operation.

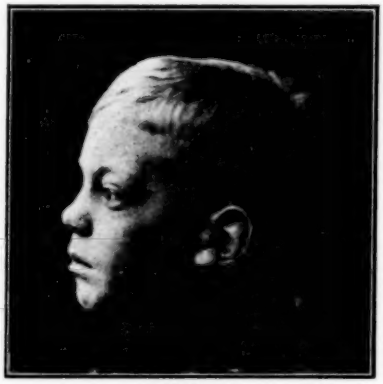

FIGURE 4.
Same case nine months after operation.

The cyst was easily separated from the surrounding tissues.

While endeavoring to detach the tumor from the sclera it was ruptured and clear fluid escaped, permitting the collapse of the cyst. The optic nerve was then exposed and severed close to ball. A section of the nerve with the cyst wall attached was then removed. The external rectus muscle and conjunctiva were then stitched back in place, the eye closed, and a compress applied. The eye-ball having been pushed forward during the development of the cyst and the ball flattened antero-posteriorly, the drawing of the ball toward the nose gave ample space for observation and dissection without disturbing the outer orbital wall. There was but moderate reaction from the operation. The stitches were removed on the 6th day. A compress was kept applied for three weeks, to support and encourage retraction of the ball.

Upon omitting the pad and permitting of exposure of the eye, there developed

an ulcer 1x2 mm. on the cornea, near the temporal margin. The ulcer healed in six days, the compress having been resumed. For several months following the operation there was manifest an edematous condition of the tissues where the incision was made. So persistent was the edema, that I entertained the thought that there was an exudate forming in the orbit from some remains of the cyst wall. The edema has disappeared. The blood supply of the retina does not appear to have been disturbed by the severing of the nerve. Possibly collateral circulation was established during the pressure of the cyst contents on the optic nerve. The movements of the eye are yet somewhat limited. The photographs were taken just previous to the operation, and months afterward.

I am indebted to Dr. William C. Finnoff for the following report of the pathologic findings.

"The specimen included the optic nerve and collapsed cyst wall which surrounds it. The section of the nerve measured 11 mm. in length and 2½ mm. in thickness. The thickness of the specimen which was nearest the globe and included the nerve and its sheaths, measured 1 cm. The posterior portion, 11 mm. from the globe, is 7 mm. in thickness. Specimen fixed in Zenker's fluid and imbedded in celloidin.

Microscopic examination: The optic nerve fibres are atrophic. The septal fibres have not increased in number or in thickness, but seem closer together than normal. There has not been an invasion of the connective tissue into the nerve. The vessel walls have not increased in thickness but are, possibly, a little smaller than normal. The arachnoidal sheath is not thickened; its relation to the nerve is normal, and it is covered only with a single layer of endothelium.

The pial sheath presents a honeycombed arrangement. There are numerous small fibrous cords covered with a single layer of endothelial cells.

The dural sheath is thickened; its inner covering a greatly thickened layer of endothelial cells. This thickened endothlium is more pronounced in the anterior portion of the specimen, and gradually thins to ten or twelve layers of cells in the posterior portion. The endothelium in the anterior portion fills the space between the pia and dura, and has a whorled appearance. In this thickened endothelium a few blood vesels are seen. They are only endothelial tubes filled with blood. The fibrous portion of the dura is also markedly thickened."

DISCUSSION.

MARCUS FEINGOLD, New Orleans. A change of the refraction in the sense of a greater hypermetropia is a characteristic symptom of tumors behind the eye, this change being due to the posterior part of the eye being bulged in.

An interesting point in this case is the fact that the operation caused so little interference with the nerve supply of the cornea in spite of the fact that during the operation the ciliary nerves must have all been cut through. The ulcer described cannot be looked upon as one due to a disturbance in the nerve supply because it occurred at the temporal margin of the cornea while ulcers seen following disturbance in the trifacial nerve are situated in the lower part of the cornea and, above all, it healed in the remarkably short time of six days.

Another point of interest in the case is the cystic nature of the tumor, such conditions being comparatively rare. The tumor is difficult to classify and the microscopic picture reminds one very much of a lymphangioma but it is very difficult to think of such tumors in this locality and we must, therefore, assume that the tumor was derived from the pial and arachnoidal sheaths of the optic nerve.

HAROLD GIFFORD, Omaha, asked if the eye still protruded after the operation. Dr. Bane replied in the affirmative. Dr. Gifford said that it was his experience in such cases that there was a convergent strabismus, from the stretching of the muscles, even where the muscle was not cut off. I do not see how the doctor could have obtained a better result under the circumstances. The operation shows that it is not necessary to do the Kroenlein operation every time you have to go into the orbit. In two cases of cyst of the sheath I have had, in one the eyeball was lost through laceration of the cornea. In these cases where the eyeball protrudes, it might be well to consider the possibility of there being a blood cyst. Have any of the members present had a blood cyst of the orbit? I have had three. On getting in, I found a large elastic mass, which would burst as I was getting ready to remove it, and a lot of blood escape. The first time I closed up (having done a Kroenlein), and the cyst subsequently refilled. The second time I swabbed out with alcohol and got a perfect result with perfect vision. Another case I treated in the same way, and the condition has to some extent recurred, but is not nearly so bad as before the oper-

ation. In another case the tumor was made up of a number of lobules, which were filled with coagulated blood.

EDWARD JACKSON, Denver. I saw Dr. Bane remove the cyst. It was certainly a very interesting condition. One thing that struck me about it was the practically unchanged character of the retinal circulation after the operation. The retinal vessels were not strikingly small and there was apparently no material change in the circulation after the operation. The only explanation I can offer is that under the slow development of the tumor there had been established a collateral circulation.

With regard to the blood cysts which Dr. Gifford refers to, I have seen one case in consultation. One thing about the history puzzled us. The tumor several times appeared to grow smaller for a time, and then increase in size again. We supposed it was a sarcoma in the orbit. The eyeball and the tumor were removed on that supposition. But the tumor was found to consist of some large vessels and a large cavity filled with blood. Probably the result would have been just as good if the eyeball had been left. I believe such an operation as that described by Dr. Bane would have been perfectly practicable in that case. Perhaps tumors of that character are not quite so rare as the literature would indicate. That would seem to be the case from what Dr. Gifford says about having seen three of them. These blood cysts are so different and require so much less radical an operation, that they ought to be thought of in the presence of a tumor in the orbit.

H. H. STARK, El Paso. I have a case on hand now that this discussion may enlighten me on. The patient has normal vision, and the tumor has grown in the past year or so. I have hesitated to interfere in this case because of the normal vision. I should like to ask Dr. Gifford if the blood cysts had a history of injury.

Dr. Gifford. In neither of the cases.

W. C. Bane, (closing), referred to having found in the literature a report by Eleonskaya of a case of cystic tumor in the optic nerve.

ADAPTABILITY OF THE PHORO-OPTOMETER STEREOSCOPE FOR THE HAITZ AND BISSELL CHARTS.

DAVID W. WELLS, M. D., F. A. C. S.

BOSTON.

A description of the instrument and methods for using it with an appendix on the prism diopter and squares for such charts.

In using Haitz charts I at first followed Haitz instructions, using an ordinary Holmes stereoscope marking on the same the distance at which the chart should be viewed. It was soon found that holding the stereoscope was tiresome for the patient, and kept it quite unsteady. As I make constant use of the phoro-optometer I found it was much more satisfactory to make the stereoscope to order for each patient.

I use for each eye +5.25 with the chart at 19. cm. In the ordinary use of the phoro-optometer stereoscope +10. is employed with the cards at 10 cm. This makes each, prism diopter = deviation of 1 mm. With +5.00 at 20 cm., and practically the same at 19 each prism diopter = deviation of 2 mm. With the B3 card the natural fusion distance is determined, and sufficient prism introduced to make lines cross at 8, since Haitz charts have a separation of 8 cm. For example: should the red line cross at 5 this means that 5 cm is the natural fusion distance. To secure the crossing at 8, fifteen diopters more is required since 30 mm more deviation is needed and at 20 cm each prism diopter=2 mm; 30÷2 =15. If the patient happens to converge, more prism will be needed, the exact amount being determined by turning the rotary prisms. The patient should wear his refractive correction, and if he be presbyopic, his reading glasses, or the necessary amount added to the +5.00.

The stereoscope is now ideal for mapping a central scotoma, and at the same time it has been demonstrated that the patient has binocular vision sufficient for the test. Since visual acuity is often poor and fusion faculty of low grade, it was found that the lines of the B3 card were too fine to be easily seen by many patients. I have therefore drawn upon the back of the chart a modification of B3 with heavier lines.

In using the Bissell Blind Spot Chart

it is necessary to get a wider field. This is easily obtained by commencing with the +5.25 decentered out 10 mm wider than the patient's P. D. and substituting for the Revolving Prisms, after the necessary amount has been determined, plain prisms from trial case. This increased distance of the lateral part of the chart changes the perfect correspondence of squares to degrees of the arc; the error being ¼° in the whole size of a normal blind spot but if one wishes to be more exact the chart can be bent by having a third support, so that the ends and the centre will be the same distance away. (See appendix.)

Lloyd's Slate (described in the *Ophthalmic Record*, August, 1917) is a combination of the Haitz and Bissell Charts, and therefore suffices for both purposes. Dr. Lloyd kindly sent me one which I have found very satisfactory. The color of the cross lines is much more subdued than the other charts of American manufacture which I have seen, and is, therefore, less confusing. If one is not fortunate enough to possess the original Haitz, he will find this a decided improvement even for central scotomata, while for the blind spot measurement it shows at a glance the relation to the macula, and the normal area according to Gradle.

The writer suggested to Lloyd and Bausch & Lomb, the making of record slips duplicating the slate. These suffice for recording either central or paracentral scotomata or blind spot measurements, for one or both eyes, and always maintain the relative positions. The data suggested by Bissell are printed on the back. One may mark on the slate with chalk as Lloyd suggests and transfer the record later; but I have found it quite satisfactory to have my assistant stand behind the patient—slip in hand—watching the point reached by the object when the patient first sees or first looses it, and mark it immediately on the slip. In this way the permanent record is finished as soon as the test is completed.

Those who do not use the phoro-optometer will probably prefer to get the special wide angle stereoscope (Bausch & Lomb). But the method described does not necessitate the patient's moving from his chair, dispenses with a new instrument and gives one a knowledge of the patient's fusion faculty, which should be investigated before attempting the test. The only expense involved is the central aluminum screen, the cost of which is trifling. Moreover, the writer still lives in hopes that more of his colleagues will recognize the value of the phoro-optometer stereoscope in fusion training and the cultivation of adduction. This adaptability for the Haitz and Bissell Charts is an additional reason for the adoption of this wonderful instrument.

In December, 1916, there was published in the Journal of Ophthalmology, Otology and Laryngology a translation of Haitz' description of his charts. Of this there are a few reprints left which will be sent to those desiring them.

APPENDIX.

DISTINCTION BETWEEN DEGREE AND PRISM DIOPTER.

The author must protest against the very common mistake of confusing the terms Degree and Prism Diopter. A *degree* (°) is 1/360 of the arc of a circle, and should be restricted to Perimetry, the measurement of Heterotropia, and Stereoscopic Kampimetry.

The unit of the *prism diopter* is a prism which deflects a ray of light 6 cm. at 6 m. Heterophoria is therefore measured in prism diopters. According to Prentice's rule, (Ophthalmic Lenses & Prisms, 1917, p. 49), the prism diopter = tangent of 34′ 22″, figured as follows:

Nearest smaller in table is—

Tangent ..... 1Δ = .01

Tangent .....0° 30′ = .008727

Difference ... = .001273

Nearest larger in table is—

Tangent .....0° 40′ = .011636

Nearest smaller in table is—

Tangent .....0° 30′ = .008727

Difference for 10′ = .002909

Dividing the whole difference by difference for 1′ = minutes to be added to 30′,

.001273 = 4.37′ + 4′ 22″

.0002909

∴ Tangent 1Δ = 0° 30′ + 4′ 22″ = 34′ 22″.

A 1° (degree) apex angle prism of glass, index 1.53, deflects a ray of light

31′ 48″ (Prentice: Ophthalmic Lenses, 1900, p. 108), so that for opthalmologic purposes the prism diopter has become the prism unit and deflects a ray of light about ½° (degree).

THE STEREOSCOPIC TANGENT OF 1°

Haitz has calculated his chart for +5.25 as this is the strength used in the standard stereoscope. At the focal distance 19 cm., this makes each square 3.3 mm. If o. u. + 5.00 is used at 19.8 cm. he says each square is .16 mm. too small. This is easily figured by the principal of similar triangles as shown by Peter (Principles and Practice of Perimetry).

From tables we obtain tangent of 1° = .017455,

1 : .017455 = focal distance : tangent required.

.017455 x 18.2 = .317681 cm. = 3.17681 mm. = tangent at 18.2 cm.

.017455 x 19. = .331645 cm. = 3.31645 mm. = tangent at 19 cm.

.017455 x 19.8 = 345609 cm. = 3.45609 mm. = tangent at 19.8 cm.

.017455 x 20. = .349100 cm. = 3.491 mm = tangent at 20 cm.

.017455 x 21. = .366555 cm.= 3.66555 mm = tangent at 21 cm.

This corresponds exactly with the result obtained above for 19 cm., but the difference between the tangent at 19 cm. and 19.8 cm. is .139 mm. and not .16. Since Haitz says the .16 mm. is "Plainly negligible," this error is of no account. In order to be more exact the author has had made a very perfect pair of +5.25 toric lenses. This takes care of the central measurements at 19 cm., but the most lateral portion of the blind spot is almost 1 cm. farther away, that is 20 cm., at which distance the square is .17 mm. too small. If the blind spot has a lateral diameter of 5° (degree) (4° 54′ Gradle), the whole error would be 5 x .17 = .85 mm. As the square is 3.3 mm. $\frac{.85}{3.3}$ = .25° (degree). That is, the blind spot would be mapped ¼° (degree) larger than reality. This is of course too slight to be of any moment, but if one wishes to be more exact the chart can be bent by having a third support so that the ends will be just the same distance as the center.

POINT FROM WHICH TO MEASURE RADIUS

There is one important item about which the author is unable to agree with the authorities and that is the *point from which* this 19 cm. should be measured. Haitz says: "Inasmuch as the focal distance is reckoned from the side of the lens turned toward the slide, the latter is to be brought to such a position that the middle of both pictures stands at about 18.8 cm. *from the bottom of the side of the lens turned toward the nose.*"

Dr. Bissell says: "The card carrier . . . . . should be just within the focal plane of the lenses, at 18.8 cm. In this position . . . . . the rulings of the card have a normal 1° angle if the centre of rotation of the eyes is at 25 mm. from the *anterior* surface of the lenses," but he furnishes no means of obtaining this data. Presumably this means that the lenses should be 13 mm. in front of the corneae, and omitting the question of rotation the 18.8 cm. is measured from the *anterior* surface of stereoscopic lenses.

Dr. Bissell refers to Mr. Max Poser, of Bausch & Lomb, as his authority, but notwithstanding his eminence as a physicist, it is impossible to regard this statement as satisfactory.

In constructing a wide angle toric lens it may be necessary to assume it will stand 25 mm. in front of the center of rotation in order that the aberration may be corrected as the eye turns, but he has adopted Haitz' point from which to measure the radius, namely, the anterior surface of the stereoscopic lenses.

Moreover he furnishes no means of determining the center of rotation, and with a hooded stereoscope it is not possible to observe or measure the distance of the lenses from the corneae, which is the only way of *approximating* the center of rotation.

In constructing a tangent screen Dr. Peter (Ibid.), says that radius is to be measured from the front of the cornea.

[1] Exhibition of a special wide range stereoscope for the Haitz & Bissell Tests. Acad. Ophthal. & Oto-Laryn., Pittsburgh, Oct., 1917.

THE NODAL POINT

To be exact it seems to the writer that the *nodal point,* being the point through which pass all rays which enter into the formation of the image, must be the apex of both similar triangles, *and must, therefore, be the point from which to measure radius.*

In the schematic eye this point is usually given as 7.3 mm. for anterior and 7.6 mm. for posterior behind the cornea. The addition of a + 5.25 will carry this point forward, the exact amount depending on the form of the lens and its distance from the eye. If the lens be toric with a base curve of —6.00 and an anterior curve of +11.25, and if it be situated at the standard distance 13 mm. in front of the cornea, the nodal point of the whole system, lens and schematic eye combined will be from 2 to 3 mm. farther forward, approximately 5 mm. behind the cornea.

Thus it appears that the nodal point is about 5 mm. + 13 mm. = 18 mm. back of the stereoscopic lenses. This is practically 2 cm., so that the Haitz chart with the 3.3 mm. square should be placed 19 cm. —2 cm. = 17 cm. in front of the stereoscopic lenses to secure the nearest approximation to a one degree equivalent.

Reference to the table on page 22 shows this error would make each square 3.66—3.31 = .35 mm. too small. This error would make the normal blind spot ½° too large but is easily corrected by adopting 17 cm. as the distance of the chart from the back side of the stereoscopic lenses. This is *equivalent to measuring the radius from the nodal point.*

But this calculation is for a schematic eye. "The nodal points differ in various eyes according to their refractive power and such differences may even exist in two eyes, having the same degree of ametropia, so that punctilious precision as applied to their positions does not seem possible of attainment.

"Besides with the use of a stereoscope there is always an error of parallax incurred due to the nodal point and the point of prism refraction not being made to coincide. This parallax is least when the eye is closest to the apex edge of the prisms; and even were the cornea in actual contact with the prism surface, the nodal point would still not be at the point of refraction of the prism. Hence a discrepancy between the plottings of the scale and the fundus will ever be present through the use of a stereoscope." (Chas. F. Prentice; personal communication.)

It is possible that the improved wide angle stereoscope may eliminate this error of parallax, but until the radius is measured from the nodal point, and the stereoscopic lenses are at a fixed distance, say 13 mm. in front of the corneae, it must be less exact than the phoro-optometer stereoscope.

Perimetry with or without a stereoscope does not correspond exactly with degrees of the retina. However, this limitation does not materially detract from the practical value of stereoscopic perimetry, as the error need never exceed ¼° (degree) if the 19 cm. be measured from the schematic nodal point of the combined system, and one would hardly presume to diagnose abnormality unless the enlargement of the blind spot were as much as 1° (degree). Moreover, the comparison of successive examinations made under similar conditions will show any change that may have occurred, that is, the error will be constant.

At the present writing the phoro-optometer stereoscope furnishes the most exact means of reproducing similar conditions. The lenses may be brought as close to the lashes as possible without touching, the pupillary distance of the lenses and the exact amount of extra prism exhibited can be recorded.

MASSIVE SPONTANEOUS HEMORRHAGES INTO THE VITREOUS.

LEIGHTON F. APPLEMAN, M. D.

PHILADELPHIA, PA.

A clinical paper reporting three cases with discussion of etiology and treatment. Read before the Section on Ophthalmology, College of Physicians of Philadelphia, April 19th, 1917.

The consideration of this subject has been prompted by the observation of three cases of this condition in the service of Dr. T. B. Holloway in the Polyclinic Hospital, the details of which I shall relate through his courtesy.

Case 1. Mrs. C. R., aged 40, came under observation on May 23, 1916, with the history of having lost the sight of the left eye six days previously. There was no history of injury. At the time she came to the clinic, there was general conjunctival congestion; the pupil was semidilated; tension was normal; she complained of pains through the eye and was conscious of a cloud over this eye. No view of the fundus was possible owing to a large hemorrhage in the vitreous appearing as a dark cloud which failed to transmit the fundus reflex.

The right eye had vision of 6/6; the disc was irregularly oval; scattered throughout the fundus were small, discrete, yellowish-white spots surrounded by fine, punctate pigment.

She was suffering from an extensive pyorrhea which had existed for a long time, for which she was advised to seek treatment but which she failed to do for about six weeks after being first seen by us. She had had one child, born dead, 11 years ago; since then had three miscarriages. The Wassermann report was negative. The urine showed a few hyalin casts and a light cloud of albumin.

She was given atropin, 1 per cent. solution, and dionin 2 per cent. solution, 1 drop of each to be instilled into the eye three times a day. Under this treatment the congestion of the eye subsided, and the density of the vitreous hemorrhage diminished to such an extent that, about six weeks later, a partial view of the eyeground could be obtained, the disc appearing very pale; the arteries very small, the superior branches of the central artery showing as solid white lines for about one disc's diameter beyond the disc edges, the lower ones having the same appearance over the disc itself but not beyond. The veins were not engorged. Numerous large hemorrhages were scattered over all portions of the fundus and in the mascular region. Finer details were obscured by the vitreous haze.

One month after the first attack, a second large hemorrhage occurred which obscured all fundus details, although a very faint reflex could be obtained in the peripheral portion above. It was only shortly after the second hemorrhage that she was finally induced to have her teeth treated, the septic absorption from this source being considered the possible cause of her intraocular condition. She was seen at intervals until October during which time, in addition to the local treatment, she was given potassium iodid. Very little change was caused in the intraocular condition, the vitreous when last seen being filled with large opacities, and it was believed that she had been having recurrent hemorrhages.

Case 2. J. L., male, aged 21, came under observation on June 10, 1916, with the statement that he suddenly lost the sight of the left eye two months previously, and could only see daylight. Vision at the time he presented himself was light projection. There had been no previous injury. He experienced no pain, excepting a "jumping" sensation over the eye. He gave a history of chancre one year previously. The right eye was normal; vision 6/6.

Examination showed, in the left eye, that the pupil was dilated and fixed, irregular in contour, with synechia down and out, and pigment spots on the anterior lens capsule. Either on, or just beneath, the posterior lens capsule a large opacity with serrated edges was seen, best by oblique illumination. With the ophthalmoscope, no fundus reflex

could be obtained from all portions. Tension 1. No external evidences of irritation were present.

In the right eye, the pupil reacted to direct light; none to indirect light. The media and fundus details were normal.

The Wassermann reaction proved strongly positive. He received several injections of arsenobenzol, and was given potassium iodid in ascending doses over a period of three months without any material change for the better in the condition of his eye, although his general health was greatly improved.

Six months later he had an attack of iritis in the same eye; this subsided promptly under appropriate treatment, although synechia occurred in spite of dilatation of the pupil because of shallowness of the anterior chamber from the fact that the lens was swollen and was gradually becoming opaque as a result of interference with its nutrition through changes in the vitreous. The tension at this time was slightly raised. When last seen, four spots of atrophy were seen in the upper portion of the iris, showing that ultimately the whole eye would probably become atrophic.

Case 3. F. B., male, aged 27, was first seen on October 27, 1916, having suddenly lost his sight in the left eye three days previously and now had sensations of a veil over the sight. There was no external congestion, and no pain.

The pupils were equal; the right 2 mm., reacted normally; the left 4 mm. reacted very slightly to direct light. The Wassermann reaction proved negative. Examination under euphthalmin mydriasis showed, in the *left* eye, a massive hemorrhage into the vitreous which obscured all details of the fundus and allowed no red reflex except in a small area in the upper part when the eye was rotated strongly upward.

The *right* eye, of which he did not complain, showed evidences of previous trouble, nor did he give any history of previous trouble. The cornea and lens were clear. The vitreous, however, contained two masses of whitish connective-tissue formation directly opposite to each other well forward, from which prolongations extended b a c k w a r d. The larger was situated in the lower inner quadrant slightly below the horizontal plane, the main body of the mass being continuous backward with the retina, the latter being drawn into elevations or ridges, apparently by tension, and the retinal vessels being continued into the elevated portion. This tension seemed to have been exerted upon the whole retina around the disc and for two disc-diameters to the temporal side as shown by striations or folds in the retinal tissue and by the unusual overlapping of the disc margins as the membrane was drawn towards the nasal side. A thin V-shaped prolongation also extended out into the vitreous from the main body of the mass and ended about midway in the vitreous on a line with the disc. A second mass of connective tissue was seen in the upper outer quadrant, slightly above the horizontal plane well forward. This also sent a free prolongation outwards into the vitreous towards the center. The main body of this mass was also continuous with the retina which was elevated and its vessels continued into the mass, the whole gradually merging into the retina by finger-like projections near the posterior pole. An irregular exudation was also seen just above the disc and to the temporal side. The superior nasal vein showed white streaks as of perivasculitis.

He was admitted to the hospital for study on November 15th. His family history was negative. General health always good. He is the father of two living, healthy children. The lungs and heart normal. Admits having had chancre nine years ago. Urine examination showed no albumin, casts or indican, and in culture showed Bacillus subtilis. Blood showed leucocytes 9400; hemoglobin 90; erythrocytes 4500000; coagulation time 5 minutes 45 seconds; blood culture sterile. Gonococcus fixation test strongly positive.

Owing to the fact that he refused to remain in the hospital as long as we desired, a test of his cerebrospinal fluid by the Swift-Ellis method was not possible.

ETIOLOGY.

Recurrent intraocular hemorrhage has frequently been reported in the literature, in many cases becoming progressively worse over a period ranging from 6 weeks to 3 years. Numerous causes are assigned to this form of vitreous hemorrhage. Noll[1] states that they may arise from: (1) Alterations in the blood (leukemia, pernicious anemia); (2) circulatory changes met with about puberty; (3) local vascular disease due to malaria, septic absorption, degenerative changes in the vessels, and hemophilia.

It is in this latter grouping that I should include the first case which I have reported, as the amount of septic absorption which must have taken place in this patient must have been tremendous. This seems the more probable in view of the negative findings in other directions.

Among other causes are, tuberculosis, which is considered by Axenfeld as the cause of intraocular hemorrhage in young persons, and of retinal periphlebitis. Knapp[2] reports two cases having this origin, one of which was cured and the other improved under the use of tuberculin. Cramer[3] and Fleisher[4] each report a case of retinal periphlebitis, with hemorrhage, of tuberculous origin. Lawford[5] believes it not improbable that recurrent vitreous hemorrhage in young men may be due to the consequences of *intestinal stasis.*

Syphilitic infection may result in vitreous hemorrhage, as in a case reported by Chevalier[6] in which improvement followed antisyphilitic drugs. But, on the other hand, this patient had other series of hemorrhages from which he recovered after treatment along different lines.

Renal disease, and trauma not infrequently are followed by intraocular hemorrhages.

Massive spontaneous hemorrhages occur less frequently than the recurrent variety. The second and third cases of my report belong to this type in which the vitreous was suddenly filled with blood and vision permanently lost. Both of these were probably specific in nature, which was shown by the positive Wassermann in one, and in the other, while the serum Wassermann was negative, we had hoped to establish it definitely by a spinal Wassermann.

Clegg[7] reports 4 cases of spontaneous hemorrhage and states that the knowledge of the cause is incomplete, and that the treatment follows no definite lines nor gives hope of bettering the condition. As bearing out the truth of this latter statement, the treatment given the cases under observation failed to favorably modify the condition.

TREATMENT.

The various methods *employed for the absorption of vitreous hemorrhages* are very well reviewed by Ormond[8], who recalls that, in the process of absorption, (1) the fluid is carried away by lymphatics and bloodvessels; (2) the solid constituents are removed by the leucocytes; the red corpuscles are destroyed and assimilated, the blood pigment being found subsequently in the surrounding tissue and in the lymphatic glands; and, lastly, the fibrous coagulation remaining is invaded by fibroblasts which gradually convert the residue into fibrous tissue which contracts and decreases the volume of the exuded mass.

He tries to influence this by: (1) Massage, (2) Ionization. He says that it is difficult to decide what effect, if any, ionic medication has until we are sure the condition is influenced by some drug or by some mechanical agent. He has used potassium iodid with the idea that iodin would be beneficial, but it is quite probable that potassium iodid only acts by general effect, and not by any local means, and its effects on thyroid secretion are of more value than any local action. In giving ionization to the eyes, a pad, 1 inch square, of 16 thicknesses of lint, is soaked in a 1 per cent solution of the drug to be driven in. The eye is closed and the pad held against it by the patient by a metal electrode connected with a battery. A pad on the back of the neck forms the other electrode. Three, four or five milliamperes of current are used for 15 or 20 minutes, then gradually turned off. This is repeated three times a week, with massage. There is no discomfort. The drugs used are quinin (under the anode), iodin (under the cathode), and occasionally chlorin. (3) Subconjunctival injections, the action of

which is explained on physiologic grounds.

He has used normal saline every 2 or 3 days; if improvement occurred, it was continued; if no improvement occurred after ten or twelve injections, it was discontinued. He believes that the effect is mechanical only, in increasing the blood supply. (4) Removal of some of the fluid and its substitution by normal saline. (5) Fibrolysin, which causes a great increase of leucocytes in the blood. Ormond states that this should make it useful but the inflammation accompanying vitreous hemorrhage rarely is sufficient to produce iritis, and any extra irritation is to be avoided at all costs, because it would probably produce further changes in the clot, and lead to an increased number of fibroblasts, thus accentuating organization.

There seem to be other observers, however, who have obtained good results from the use of this substances in vitreous hemorrhage. Ollendorff[9] obtained a doubling of visual acuity after five conjunctival injections of 0.3 to 0.6 cc. of fibrolysin at intervals of from 4 to 10 days, in a case of dense vitreous opacities from a tuberculous uveitis in which cautious use of old tuberculin and other lines of treatment had failed. Thilliez[10] reports a case in which, after numerous relapses, very marked benefit seemed to result from intragluteal injections of fibrolysin 0.2 gm. repeated three times a week. More recently, Westphal[11] in one case, reports an increase of vision from about 1/12 to 1/4 after 2 injections subconjunctivally of 1/10 cc. of a solution of 0.01 centigram of thiosinamin with 0.0075 milligram of antipyrin to each cc. This treatment covered a period of about 5 weeks. (6) Dionin, he believes, probably of value as a result of the increase in lymphatic activity. (7) Potassium iodid is probably of value in that the iodin possibly combines with the albuminous material in the blood clot and forms a soluble albuminate which can be absorbed. It may also, by stimulating thyroid secretion, modify the formation of new connective tissue. (8) Radium. The investigations of Chambers and Russ showed that the Beta and Gamma rays had no effect upon normal blood. The Alpha rays had a hemolytic action, the hemoglobin being released, and oxyhemoglobin changed to methemoglobin. The white cells degenerated and, in certain experiments, the leucocytes seemed to move away from the area exposed. They had apparently no selective activity, the difference depending upon the resisting power of the tissues, and it is probable that epithelial cells, being more highly differentiated and developed, would have less resisting power than the less differentiated connective tissue cells. For this reason, it seems to Ormond that, in using radium to destroy fibroblastic cells in organizing blood clot, we must be careful not to injure the corneal epithelium or the more highly developed cells of the retina. He doubts whether radium would be of much value because of this danger. Theoretically, he is not at all hopeful that radium is likely to produce very satisfactory results, but sees no reason why it should not be tried, as theory and practice do not always coincide, and, so long as care is taken, the effect is more likely to be negative than positively harmful, and some benefit may declare itself.

As radium has a hemostatic action, it may be used as soon after the injury as possible, and it is likely perhaps at that time that some benefit might be obtained; also the destruction of the red cells would probably render the blood more capable of absorption. In later stages, however, when organization has begun, it may prevent fibroblastic cells from entering the mass and so delay clotting, leaving the blood still fluid, and hence more capable of absorption. He recalled that Koster, at the International Congress of Medicine, stated that he had obtained improvement in cases of vitreous hemorrhage by radium, and had found it had a hemostatic action, so that he was able to use it in the early stage.

Bennett[12] reported a case in which recurrent vitreous hemorrhage was definitely improved by thyroid.

It is unfortunate, for a full study of the causes in these conditions, that we cannot have the full cooperation of the patients, as it is only after most careful search, in some of these cases, that the cause can be discovered. Likewise, in

treatment, if any means will be found which will cause these masses of extravasated blood to be absorbed without leaving a dense residue, with consequent loss of sight, it will only be after much study. The present multiplicity of remedies used in attempts to clear up these hemorrhages shows that we are as yet far from having an ideal method of treatment.

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THE RISE AND PROGRESS OF OPHTHALMOLOGY AS A SPECIALTY IN PHILADELPHIA

SAMUEL D. RISLEY, M. D.

PHILADELPHIA.

An historical sketch of the early ophthalmologists in that city, their organization, the institutions they worked in, and their more important contributions to the literature and science of ophthalmology, read before the Section on Ophthalmology of the College of Physicians of Philadelphia.

The silent years as they pass carry with them the men whom they had cherished, obscure the memory of their accomplishments, and conceal their measure and motive; their designs and aspirations. It is, therefore, highly fitting and important that each generation should preserve, as far as may be, an imperishable record of its noteworthy achievements and of the men who wrought them. Having this in mind, I have prepared the following brief history of *the rise and progress of Ophthalmology* as a special branch of Medicine and Surgery in Philadelphia, together with some account of the men whose names appear in its annals — names, many of which still linger fondly in our memory.

No consistent register has been preserved of the eminent men to whose labors we are indebted, or of their contributions to our knowledge other than is to be found in biographies, or memories compiled by the friendly hand of some appreciative contemporary, by patient search in the published procedings of many scientific societies, or through the medical press of approximately three generations. To search thoroughly for their scientific work and register the result as a demonstration of the steady progress of ophthalmology in our City, would be a worthy memorial to the industry, ability and renown of a considerable group of notable men who honored Philadelphia by their character and labor, and left to us a great inheritance. Valuable as such a record would be it would not convey an adequate conception of the intimate personal relationship of these men to their work, and to the social and sociologic environment of their time. Any account of this phase of the origin and progress of ophthalmology in Philadelphia must, in a large measure, be afforded by the recollections of former conditions and events by those still living. Recognizing fully that any personal memory or estimate may be faulty, it is nevertheless the only resource in the absence of a writ-

ten record of the events as they transpired.

THE FIRST PUBLIC INSTITUTION.

The first record of any organized effort for the study and treatment of the diseases of the eye is the report of a meeting held February 8, 1822, for the founding of THE PENNSYLVANIA INFIRMARY FOR DISEASES OF THE EYE AND EAR. A brief acount of this meeting was published by the late Charles A. Oliver, from which the following statement is taken:

"Mr. James Gibson acted as Chairman, Dr. Isaac Hays as Secretary, Mr. Richard C. Wood as Treasurer. Wm. Meredith, Charles N. Bancker, Manuel Eyre, Robert M. Patterson, M. D. Clement C. Biddle, Wm. McIllvaine and Richard C. Wood were chosen as Managers; Dr. Isaac Hays, Dr. George B. Wood, Dr. John Bell and Dr. Robert E. Griffith were elected as the Surgical Staff. Number Four South Seventh Street was subsequently rented at $100 per year for the purpose of the Infirmary."

That the enterprise met successfully the benevolent design of its founders is made evident in the fact that four years later, 1826, Dr. Isaac Hays, while Surgeon at the Infirmary, is reported by Dr. Alfred Stille, in an eloquent memoir, to have published the following papers:

(1) "Inflammation of the Conjunctiva," Philadelphia Journal of the Medical and Physical Sciences, Vol. XIII. P. 84. 1826.

(2) "Inflammation of the Sclerotica," Ibid. P. 211. 1826.

(3) "Iritis." Vol. XIV. Page 217. These papers, Dr. Stille remarks, "appear to have laid the foundation of the high repute which Dr. Hays afterward attained as an ophthalmic Surgeon and probably determined his selection as one of the first Surgeons at the Wills Hospital," eight years later.

It is of interest to note that the men who composed the Staff of the Infirmary were general surgeons and physicians, and two of them, Dr. George B. Wood and Dr. Isaac Hays, had even then won a wide reputation in the professional field. The subsequent history of the institution is uncertain.

WILLS EYE HOSPITAL.

Notwithstanding the earlier effort, the establishment and growth of ophthalmology in Philadelphia is indissolubly associated with the founding of the Wills Hospital through a bequest to the Mayor and corporation of the City of Philadelphia by one James Wills, Jr., in 1825, which, because of protracted litigation by the heirs, did not become effective until 1831. The remote influences and circumstances which culminated in this foundation date back to Colonial times. Anthony Benezet, a philanthropist of Philadelphia, was born in Picardy, France, in 1713. His parents were driven from their native land by religious persecution in 1715 and took refuge in England, where they adopted the religious views of the Quakers. In 1731 he emigrated to Philadelphia where he was cordially received by the Society of Friends. His home was established at 115 Chestnut Street, above Third, near the present site of the Bank of North America. His philanthropy is still perpetuated in a school for "Colored Youths" situated on the northeast corner of Hutchinson street, a small thoroughfare off Locust street, west of Ninth, to which he left a legacy of ground rents. He had in his employ a coachman, one James Wills, who after the lapse of years left the employ of the benevolent French friend, and with his small savings began an independent business as a grocer on Chestnut street near Front. At his death he left his fortune and business to his son, James Wills, Jr. Both father and son seem to have been imbued with the benevolent spirit of Anthony Benezet, for on the death of James Wills, Jr., on January 22, 1825, after sundry bequests, he conveyed the residue of his estate to the mayor and corporation of the city of Philadelphia, for the time being and to their successors in office forever, in trust, for the purchase of a sufficient plot of ground in the City of Philadelphia, or in the neighborhood thereof, and thereon to erect, or cause to be erected, suitable buildings for a hospital or an asylum, to be denominated "The Wills Hospital for the Relief of the Indigent Blind and Lame." The mayor and corporation of Philadelphia were to appoint trustees and managers to carry out the will of the testator. After a period of litigation the

residue of the estate passed into the control of the mayor and corporation in 1831 and has to the present time been administered as one of the numerous city trusts. It is of interest to note that under the terms of the will it was not clear whether the founder had in mind an asylum for the care of the blind, or a hospital for the treatment and care of indigent persons afflicted with diseases of the eye. After much discussion the inquiry was decided, fortunately, in favor of the latter possible interpretation of the will of the testator.

The corner stone of the present central building situated on Race street, then known as Sassafras street, west of Eighteenth, and constructed on plans drawn by Thomas N. Walter, was laid with suitable ceremony on April 2, 1832. An eloquent address by Mr. Joseph R. Ingersoll was delivered, and the completed building, with its strikingly classic Greek front elevation, ready for the fulfillment of the noble design of its founder was turned over to the mayor and councils by the committee on construction on November 28, 1833. On February 3, 1834, Dr. Isaac Parrish, Dr. Squier Littell, Dr. Isaac Hays and Dr. George Fox were appointed as the first Surgical Staff of the Hospital, and on March third the institution was opened for the reception of patients. The hospital then began its singularly beneficient career witl. the above named eminent physicians in charge of its wards, giving their time and service gratuitously for the relief of a special class of the afflicted. During that year, 1834, forty-nine patients were received into the wards. Until 1839 there was no service or clinic for out-of-door patients applying daily for treatment, but living in their own homes; nor is there any record of the appointment of a resident medical officer. The subsequent history of the institution shows a steady and rapid growth, and extending reputation and usefulness, until in 1916 there were upward of seventeen thousand new patients.

This rapid and continuous growth not only demonstrated forcibly the need for such a charitable foundation in the community, but with equal force the fact not generally recognized or appreciated, that not only would the Wills Hospital, but many other charitable foundations in our city, have failed to meet the benevolent design of their founders, but for the gratuitous labor of the physicians and surgeons who compose their respective professional staffs.

Primarily designed as a pure charity under the terms of the bequest, the Wills Hospital committee of the Board of City Trusts has strictly observed the intention of the testator, denying its benefits to all but the indigent, and no private rooms have ever been provided for the care and treatment of patients able to pay for professional advice. In this history, however, we are not so much concerned with the Wills Hospital as a charity, valuable as it has been in that phase of its career, as with its even greater value and importance as a school of ophthalmology, and this it has proven to be almost from the beginning.

A list of the men who have served on its staff of surgeons from 1834 to 1870, without exception renowned in the annals of Philadelphia medicine, is a sufficient explanation of how and why, without any expressed design upon the part of its founder or administrators, it became a School of Ophthalmology. Isaac Hays, George Fox, Squier Littell, Isaac Parrish, John Neill, Edward Hartshorne, T. G. Morton, George C. Harlan, A. Douglass Hall, F. W. Sargeant, Addinell Hewson, Wm. Hunt, R. J. Levis and D. Hays Agnew constitute a galaxy of men widely known, whose fame as teachers not only brought a steadily increasing number of patients to their respective daily clinics, but attracted many medical men both from the city and remote districts to study diseases of the eye.

It will be observed that none of these men were devoted solely to the practice of ophthalmology, they were first of all general surgeons and physicians. In addition to this group of well known men there was a still larger group during this period, from 1834 to 1870, made up of resident and asistant surgeons, many of whom have been awarded signal honor in the field of ophthalmology in the United States, affording a striking illustration of the hospital as a school. It is to be noted that during these years, there were few if any specialists in the

practice of medicine and surgery. It is true that in the medical schools were taught the seven branches by men who became especially expert and, quite without design on their part, were in some measure recognized as specialists in their respective fields and as consultants by the body of the profession. This was particularly true of Surgery and Obstetrics, and in less degree of the theory and practice of medicine; but these men did not regard themselves as specialists, nor did they confine their practice to the branches they taught.

Indeed, in the mind of the profession prior to 1870 there existed a deep seated prejudice against any claim to a special knowledge of the diseases of any organ and any such claim relegated the individual to the unsavory confines of charlatanism. This hostility to the specialist in medicine was due in large measure to the bizarre advertisement of the ignorant charlatan; a survival from earlier times of the medical mountebanks whose character and methods had justified the lampoons and caricatures by contemporary poets and novelists in ridicule of the doctor; characterizations which still survived in the memory of the educated portions of the community, and rankled in the mind of the doctor of that day, as they do in ours, as an injustice to a learned and philanthropic profession. (As an example of the methods pursued by these characters, I recall a sign in large gold letters on the windowpane in the second story of a building confronting my preceptor's office, "Dr. Reed and Dr. Lichtenspiel, *Specialists* in Diseases of the Eye, Ear, Lungs and Pelvis Organs—Examination Free." Nor can I forget the emphatic language of my preceptor with which he consigned these "Frauds" to the seventh depth of some medical inferno.) It is even now difficult to comprehend why the pen of genius, as represented by Eugene Sue should have passed by the honorable membership of the French Academy to depict instead the unsavory character of N. Baleinier, or Dr. Louis or Balsame, while it is only fair to suppose that the Clinical Society of London, or the Sydenham Society, might equally have furnished for contemporary literature, material for other pictures than the shafts of caustic satire or malice and ridicule.

In 1870, however, a number of potent factors were present which rapidly undermined the hostility to specialism. For a few years a small group of men had been practicing ophthalmology more or less as a specialty and according to the recognized standards of ethical medicine. These men were Dr. W. W. McClure, Dr. Ezra Dyer, Dr. P. D. Keyser, Dr. A. Douglass Hall, Dr. George C. Harlan and Dr. William Thomson. But prior to the work of these men was the efficient service rendered for more than thirty years by a group of able, not to say extraordinary men, who, while engaged in the general practice of medicine, and renowned for their diversified learning and philanthropies; many of them members of families prominent from Colonial times, had nevertheless devoted the greater part of their laborious professional service to the study, teaching and treatment of diseases of the eye while serving as members of the Wills Hospital Staff. Their influence and work as teachers and consultants could not fail of recognition and appreciation and had done much to remove the prejudice entertained by the body of the profesion against specialism.

I know of no more inspiring study than the memoirs and biographies of these men to whom we are in a large measure indebted for the foundations they laid upon which our present ophthalmologic structure is reared. Dr. Isaac Parrish, although of remote Dutch ancestry, was a member of the Society of Friends. In accordance with the practice of his day he was a student of medicine in the office of Dr. Joseph Carson in 1830 and 1831; a resident physician at the Blockley Hospital, and in 1834 was appointed to the Wills Hospital as a member of its first surgical staff. He was the most active member of the staff as a teacher and gave the first regular course of instruction at that institution; probably the first given in Philadelphia on ophthalmic surgery, during the winter of 1839 and 1840. He occupied this position upon the staff until his death in 1852 and was always surrounded by classes of students. In addition, he was an active member of the College of Physicians,

took a leading part in the County Medical Society of which he was twice president, and was a member of the committee on founding the American Medical Association. He was deeply interested in the hygienic condition of the city and was constant in his efforts to improve the insanitary conditions prevailing then, as now, in the numerous courts and alleys of the municipality. He was also an earnest advocate of prison reform.

Dr. Isaac Hays was born in 1796, graduated from the University of Pennsylvania as Bachelor of Arts in 1816 and Doctor of Medicine in 1820. In 1822 he was appointed a member of the staff of the Pennsylvania Infirmary for Diseases of the Eye and Ear, from which post we find his fertile mind contributing to literature the fruits of his observation of diseases of the eye—certainly among the first, if not the first, contributions to ophthalmic literature in America. In 1827 he became editor of the American Journal of the Medical Sciences, and conducted this important periodical with great renown until 1879. In 1834 he was appointed on the Surgical Staff of the Wills Hospital, a post which he filled with marked industry until 1854. During those years he edited and added to the then famous work of Sir William Lawrence, "Diseases of the Eye," for which he received the general thanks and admiration of its widely known author.

He recorded the first case of astigmatism published in America. Donders cites in historical order the first five cases reported of which Dr. Hays' case stands as the fifth. Dr. Jeffries of Boston gives him the credit of having observed the first case of color blindness as a pathologic condition. During his service at the Wills Hospital he devised a knife for the cutting up of hard cataract to secure its absorption. This knife, although not used for the purpose designed by its inventor, is still in daily use at the Hospital for discissions of soft cataract, for capsulotomies, etc., and is still known as the "Hays' Knife." In the midst of these activities he edited "Elements of Physics," "Wilson's Orithology," and a dictionary of medical terms. He was one of the founders of the Franklin Institute, a frequent attendant at the Wistar Parties and a delegate to the convention which originated the American Medical Association in 1846. He was a member of the Philosophical Society and was chairman of the building committee of The College of Physicians of Philadelphia. His biographer, Dr. Gross, makes the following eloquent comment: "He lived a busy and fruitful life, a striking example of the amenities of scholarship, and lived in a home of luxury surrounded by a group of friends —medical men—gentlemen of the old school."

Dr. Squier Littell, born 1803, was a student of medicine in the office of Dr. Joseph Parrish in 1821, and graduated M. D. from the University of Pennsylvania in 1824 becoming a general practitioner of medicine; and in 1834 was appointed one of the Staff at the Wills Hospital and published his widely known text-book on "Diseases of the Eye" in 1837, followed in 1838 by his brochure on "Tumors of the Brain as a Cause of Amaurosis." He gained a wide and just reputation as an Ophthalmic Surgeon, his text-book being regarded for many years as an authoritative statement of diseases of the eye. Among his many other activities he was an earnest churchman and a member of the Committee on revision of the Prayer Book. He served as a member of the Wills Staff continuously from 1834 to 1864.

Dr. George Fox, the fourth member of the original Staff, was born May 8th, 1806. He was an Orthodox Friend and a grandson of Joseph Fox, the speaker of the Colonial Assembly. He was graduated from the Department of Arts of the University of Pennsylvania in 1825, dividing the second honor on Commencement Day with his life-long friend Adolph Borie, and began the study of Medicine under the preceptorship of Dr. Joseph Parrish and his brother, Dr. Samuel M. Fox. After his graduation at the University of Pennsylvania in 1828 he became Resident Surgeon of the Pennsylvania Hospital where he was the inventor of the apparatus for the treatment of fractured clavicle which is still known by his name. His biographer, Dr. Ruschenberger, relates that "he speedily acquired local reputation as a Surgeon,

Oculist, Obstetrician, and skilled Physician." In November, 1839, he contributed to the American Journal of the Medical Sciences, edited by his friend and colleague Dr. Hays, a "Report of Cases of Diseases of the Eye Treated at the Wills Hospital during the months of April, May and June, 1839." He delivered clinical lectures at the Hospital but resigned in 1849 and was immediately elected a member of the Board of Managers of the Hospital and served in that capacity until his resignation in 1854. In 1848 he was Visiting Surgeon to the Pennsylvania Hospital where he served six years, then he resigned, apparently retired from professional work, and died in 1882 at his place on the Delaware River above Torresdale.

Such in brief was the work and measure of the four men who composed the first Staff at the Wills Hospital, who with much justice may be accredited with having laid with great industry and honor the foundation for Philadelphia Ophthalmology; a foundation deeply imbedded, firmly rooted in the rich soil of general scientific medicine; a condition essential for development and permanency. One is reminded in their lives and work of the famous contention of Alexander Hamilton in the infancy of the Republic that "A Nation of Specialists, whether farmers or bankers or manufacturers, lacks the essential conditions of permanency; for its various parts (when working independently), do not afford an adequate support one to another."

SCHOOLS AND SOCIETIES.

Noteworthy among the influences which in 1870 led to an almost sudden change in the establishment of Ophthalmology as a specialty in Philadelphia was the opportune return of Dr. William F. Norris and Dr. George Strawbridge from their studies in the special clinics of Europe. Soon after their return they were appointed Lecturers on Ophthalmology and Otology in the Medical Department of the University of Pennsylvania, then situated on the west side of Ninth Street between Market and Chestnut Streets, on the site of the present U. S. Post Office Building. There were no hospital facilities provided but a daily clinic at two o'clock P. M. was opened for the gratuitous treatment of diseases of the Eye and Ear. From this service was drawn illustrative material for a weekly clinical lecture to the medical students. The lectures were given in the Anatomical Amphitheatre but attendance was not obligatory, and the classes were small; nor was an examination in Ophthalmology and Otology required for the medical degree. It was, nevertheless, the beginning of organized ophthalmic teaching at the University of Pennsylvania:—the dawn of a new Era.

Another influential factor in the establishment of Ophthalmology was the organization of the American Ophthalmological Society in New York City in 1864. It was composed of men, all or most of whom, had become personal friends during foreign travel and study in European Clinics. Their annual meetings for the presentation and discussion of papers soon became notable and inspiring occasions for delightful social intercourse and the cementing of enduring friendships; until they became a band of brethren zealous for professional renown and exemplars of the highest professional ideals. It was at the second annual meeting, June 13th, 1865, with twenty members present that our own Dr. Ezra Dyer, too soon lost to Ophthalmology, presented his important paper on "Asthenopia and Its Treatment by Graduated Exercise of the Accommodation" which afterward came to be known as "Dyerism." The published transactions of this Society setting forth the scientific work of its gradually increasing membership, rigidly selected from different sections of the country, soon proved a powerful influence, not only in removing any hostility to specialism, throughout the United States, but as a noteworthy example of the highest standards of medical ethics and practice. There probably is no other single publication where one can better trace the progress of scientific ophthalmology or the rising tide of professional *Esprit de Corps* than in the transactions of the American Ophthalmological Society. In the annual recurring volumes new names

are introduced. In 1865 appear among the founders Thomas G. Morton, and Ezra Dyer; in 1869 A. D. Hall and William Hunt; in 1870 William F. Norris and William Thomson; in 1871 George Strawbridge and later George C. Harlan; all of whom were at the time or a few years later members of the Wills Hospital Staff. The subtle and powerful influence of the annual meetings of this Society over the establishment, reputation and progress of Ophthalmology in the United States cannot be overestimated. In no city was its influence more signally felt than in Philadelphia. Its standard was such that an invitation to membership could but be regarded as a signal honor.

Another important event as indicating the rising tide of specialism in this City was the founding of the "Ophthalmological Society of Philadelphia." The meeting for organization was held on February first, 1870, in the Pennsylvania Hospital at eight o'clock P. M. There is no record of the influences leading to the call for this meeting. The minutes were in the hand-writing of Dr. William F. Norris and the following named men are recorded as present: Doctors R. J. Levis, George Strawbridge, W. F. Norris, Wm. Thomson, E. Hartshorne, Morris Longstreth, Thomas G. Morton, Harrison Allen, W. W. McClure, A. D. Hall, J. N. Brinton, Ezra Dyer, L. H. Adler and Wm. Hunt. Organization was effected by the election of R. J. Levis as temporary President, and Wm. Hunt as temporary Secretary, on motion of Dr. T. G. Morton. The following men were then reported as wishing to be included in the original organization: Drs. Isaac Hays, F. F. Maury, D. H. Agnew, O. P. Rex, J. N. Packard, S. W. Gross, E. A. Page, W. H. Pancoast, J. F. Weightman, E. Livezy, G. C. Harlan, C. S. Boker, A. Hewson, T. H. Andrews, W. W. Keen, John Ashhurst, Jr., and H. S. Schell:—a representative group of men in the annals of Philadelphia Medicine and Surgery.

A permanent organization under the title of "The Ophthalmological Society of Philadelphia" was then effected by the election of Dr. Isaac Hays as President, then aged seventy-four years; Dr. E. Hartshorne and Dr. T. G. Morton as Vice-Presidents, Dr. Wm. F. Norris as Secretary, and Dr. Wm. Hunt as Treasurer, Dr. George Strawbridge and Dr. L. H. Adler acting as tellers. Drs. Thomson, Allen, Dyer, Brinton and Strawbridge were appointed a committee to draft a constitution and by-laws for the government of the Society. The temporary Chairman and Secretary were on motion added to the committee. Dr. Hartshorne was appointed a Committee to "ask permission of the College of Physicians to meet in their building." The meeting then adjourned to meet at the call of the Committee on Constitution and By-Laws. This second meeting occurred on February 15th, 1870, place not stated, but presumably at the College of Physicians, as all of the subsequent meetings were held there, then situated at Thirteenth and Locust streets. The draft of the Constitution and By-Laws was presented by the Committee and adopted after prolonged discussion over the publication of papers *"as read before The Society,"* elsewhere than in its transactions; the permission to do so being finally granted only after the consent of the Society. No copy of the Constitution and By-Laws as adopted are included in the minutes, but quite recently an engrossed copy was accidentally discovered in my own library, and is herewith presented with the Constitution as adopted for presentation to the College.

The first meeting for scientific business was held on March first, 1870, and was devoted to the presentation by Dr. T. G. Morton of three cases of orbital aneurism with exophthalmos which was discussed at length by Dr. Wm. F. Norris. Dr. Samuel Ashhurst. Mr. S. L. Fox and Mr. Joseph Zentmayer, opticians, were added to the list of original members. The meeting of April first was devoted to intraocular cysticercus. In the course of the discussion Dr. R. J. Levis detailed a case where numerous cysticerci were found in the straight muscles of the eye. It is of interest to note that at this meeting Dr. Strawbridge exhibited a tonometer of his invention. The meetings held monthly, were well attended, and the elaborate minutes of the scientific proceedings, all in the handwriting of Dr.

Norris, set forth their highly interesting character. On March 7th, 1871, Dr. S. D. Risley was introduced as a new member of the Society but had been present by invitation at several of the preceding meetings. Dr. Isaac Hays, the President, had not presided over any of its meetings probably because of advanced age and failing health. The monthly meetings recurred with unabated interest and enthusiasm until November, 1872, at which time there were present Drs. Wm. F. Norris, T. G. Morton, Samuel Ashhurst, John Ashhurst, Jr., Wm. Hunt, H. S. Shell, R. J. Levis and S. D. Risley. There is no minute of another meeting until November, 1874, after an interval of two years. No scientific business was transacted, but Dr. Wm. F. Norris moved that "the Society proceed to dissolve and that the funds on hand be turned over to the library of the College of Physicians of Philadelphia for the purchase of books upon the subject of Ophthalmology." This motion with some modifications, was favored by Dr. Thomson and Dr. Harlan, but opposed by Drs. Goodman, Strawbridge and S. Ashhurst, and resulted in an adjourned meeting when Dr. Norris repeated his motion which was lost. A stated meeting was held January 5th, 1875, at which the resignations of Drs. S. Ashhurst, Wm. F. Norris, George C. Harlan, S. W. Gross, H. S. Shell, and Wm. Thomson, were presented and accepted. The President, Dr. E. Hartshorne, the Secretary, Dr. A. D. Hall, and the Treasurer, Dr. Wm. Hunt, then resigned their respective offices. Dr. Strawbridge was then elected President, Dr. McClure Secretary and Dr. Ernest Goodman as Treasurer. Only two subsequent meetings were recorded, both of a social character at the residence of Dr. Strawbridge, the last being in April, 1875.

The writer recalls his personal regret over the dissolving of the Society because of the absorbing interest of its meetings. The earnest presentation of unusual cases, their study and discussion by the group of vigorous men who regularly assembled at its meetings for two years left an enduring impression upon his mind, not only as a young student of Ophthalmology, but as an unconscious student of methods and of men. One longs for the inspiration of genius and the brush of the master painter, the chisel of the great sculptor, or even for the skilled pen of the ready writer, that he might call forth from the storehouse of memories and place before this generation the portraits of this group of men; individual, independent, each a distinctive forceful personality. But what canvas would retain, or marble portray, or words reveal the enthusiasm, the industry, and the indomitable pursuit of truth for truth's sake, with which each was imbued and which quite unconsciously emanated from each to other as he took the floor in presentation of cases for study by his colleagues or rose for discussion. To the young onlooker it was educational and inspiring. Strange indeed if the lives and work of these men, had awakened no echo in the generation to follow.

It soon, however, became obvious that the membership of the Society was not homogeneous. It was constituted by two groups, inevitably divided by the subtle barrier of training. On the one side stood an assemblage of well and widely known teachers, general physicians and surgeons; on the other a smaller group of equally well known men who had thoughtfully chosen to devote their lives to the study and treatment of the diseases of the Eye. The final dissolution was indeed an expression of the leaven of specialism, working more and more potently in the medical life of the city.

PERSONAL EXPERIENCES, TEACHING.

This brings the record of events within the purview of my personal experience. It is not, however, the design of the author of this historical sketch to present an autobiography, but to record events and conditions as they transpired under his observation. Prior to 1870 the course of Medical instruction required for the degree of M. D. was a series of lectures in the seven branches:—Anatomy, with opportunity for dissection; Physiology; Chemistry; Materia Medica and Therapeutics; Institutes of Medicine; Obstetrics and Surgery. The lectures were given daily in each of these branches

from October to March. A second year was required, the same lectures being repeated from the respective professional chairs. At the close of the second year an oral examination was held by each professor in his own branch and a thesis required.

In addition to these didactic lectures, a weekly clinic was held by the professors of Therapeutics, Practice of Medicine and Surgery, and a Surgical Clinic at the Philadelphia and Pennsylvania Hospitals, on each Wednesday and Saturday, open to all medical students in the city. Occasionally an eye case, usually some inflammatory affection, would apply for treatment, or, at the Surgical Clinic, an occasional case of cataract or strabismus. On one of these occasions I witnessed for the first and only time a couching of the opaque lens. A young girl was brought to the clinic for the correction of what I now know to have been concomitant converging strabismus. The parents were advised against operation because the squint made her appear "cute" and if the muscles were cut the squint would either return or the eye was likely to turn outward. No word was said about the refraction. During the winter of 1869-1870 Dr. Henry D. Noyes of New York, by invitation, gave a lecture on "Ocular Affections," which was illustrated by colored lantern slides of the *Fundus Oculi* and Dr. Wm. Thomson, then Assistant Surgeon at the Wills Hospital, a lecture at the Pennsylvania Hospital on "Errors of Refraction." It was at this lecture I heard, for the first and only time in my Medical Course at the University, the terms myopia, hypermetropia and astigmatism.

There was at that time no ophthalmologic teaching in Philadelphia excepting the desultory instruction incidentally given at the Wills Hospital.

In April, 1871, a year after my graduation in Medicine, a case of eye disease applied for treatment but proved refractory. The rapid recovery after consultation with Dr. D. Hayes Agnew, who had been on the Wills Staff from 1864 to 1868, demonstrated to me my profound ignorance of eye diseases, and resulted in a visit with Dr. Chas. K. Mills to the Wills Hospital seeking opportunity to observe and study. Dr. Mills, just then beginning his studies in Neurology, remained several years for the study of Ophthalmoscopy and Ocular Diseases. To my great gratification, Dr. George C. Harlan at this first visit invited me to assist him as clinical clerk:—an invitation which was eagerly accepted and proved the beginning of a delightful association as pupil and teacher, friend and colleague to the close of his busy and useful life. His colleagues on the Hospital Staff were: Drs. T. G. Morton, A. Douglass Hall and R. J. Levis, their respective terms of service being three months. As Assistant Surgeons, there were: Drs. Harrison Allen, W. W. McClure, Edward Livezy, Wm. Thomson and H. E. Goodman. In 1872 Drs. Thomson, Goodman, Wm. F. Norris, W. W. McClure, P. D. Keyser and Ezra Dyer were appointed Surgeons, thus increasing the Staff to ten. The term of service was made continuous for each Surgeon throughout the year, on alternate days, five Surgeons being on duty each day. In 1871, I assisted Dr. Harlan during his three months term of service and remained with Dr. Thomson and later with Dr. Hall through their respective terms, at the close of which I was requested by Dr. Norris to assist him as Chief of Clinic at the newly established Eye Service at the University of Pennsylvania.

The nascent state of Ophthalmology at that time is forcibly illustrated by my year's experience with the different Surgeons at the Wills Hospital. Dr. Harlan advised me to read Donders' Book on the "Anomalies of Refraction and Accommodation," a copy of which I found in the Mercantile Library and studied with avidity, but soon discovered that the members of the Wills Hospital Staff were not familiar with its teachings. Dr. Harlan was Otologist at the Children's Hospital where I assisted him. Drs. Goodman, Morton, and Levis were general Surgeons actively engaged in their general work. In their Wills Service some of the Surgeons in 1871 paid little or no attention to the refraction problems which now engross so much of our attention, but in most respects their Surgery of the Eye was beyond re-

proach. Their skill in the extraction of cataract, as shown by their results, I have not seen excelled in later years. Simple extraction was the usual operation performed. When convalescence was complete the patient was sent to McAllister, then the leading optician in the city, for the selecting of a glass.

That the errors of refraction, however, were gradually asserting their important place in ophthalmic practice was shown by the fact that in 1871 Dr. W. W. McClure gave a course of lectures at the Wills Hospital in the Evening illustrating various phases of the dioptric system of the eye by a lantern and slides, both of his own construction. These lectures, my study of Donders, and the opportunity to apply daily the newly acquired knowledge at the Clinics of Drs. Harlan, Thomson and Hall, soon awakened a deep interest and an early appreciation of the clinical importance of the anomalies of refraction. It was at this time I detected and corrected by glasses my first case of mixed astigmatism which proved to be as great a curiosity to the Hospital Staff as to myself.

The University Ophthalmological Clinics, under the guidance of Dr. Norris, fresh from his European experience, soon became an inspiration to the study of scientific Ophthalmology. Instead of the simple Extraction of Cataract, I witnessed for the first time the "Peripheric, Linear Extraction" of the lens with iridectomy after the manner of Von Graefe, Arlt and Mauthner, who had been his teachers. Cases of glaucoma and the invariable iridectomy appeared at the Clinic, and the correction of refraction errors with atropia—the only mydriatic and cycloplegic then in use, soon became an important feature of the service. I recall the discussions as to whether full or partial corrections of the hypermetropia were to be preferred. Our knowledge of the abnormalities of binocular vision was confined to strabismus, and paralysis of the extraocular muscles. To the students of Donders, however, were known also the variations of the range and region of accommodation and convergance associated with errors of refraction. The anatomic abnormalities resulting in the anomalies of binocular balance—the heterophorias—were in the womb of the future.

Insufficiencies of the Interni were recognized, but when present in association with myopia were regarded as due to the enlarged myopic eye ball, as taught by Donders, but we overlooked as Donders himself did, the great clinical importance of the observations he had made as to the disturbance of the range and region of accommodation and convergence in the hypermetropic eye. The extensive group of abnormalities of binocular vision, which Stevens denominated many years later as heterophoria, were not understood. The signal importance of the Myopic Eye and the gravity of the associated pathologic changes were recognized. Extensive European literature setting forth the diverse conclusions of many observers as to its nature and etiology was open for study, including the statistics of the school examinations of Cohn of Breslau and Errisman of St. Petersburg and also the observations of Beer of England; but the views we now entertain as to the genesis of the Myopic Eye may be justly accredited to Philadelphia Ophthalmology. Like claim may also be made for work done in our City in impressing upon the mind of the profession the signal importance of the anomalies of refraction and their associated abnormalities, as etiologic factors in the symptom complex of asthenopia.

It had been contended by some observers that the Hypermetropic Eye was to be considered as the Model or Standard Eye since it was present in all animals, and was far more numerous in man than all other states of refraction. In Philadelphia, however, the view was accepted as early as 1873 that Emmetropia was the standard state of refraction and that the ideal conditions for comfortable physiologic binocular vision were constituted by two Emmetropic Eyes, each with normal acuity of vision and a physiologic range and region of accommodation and convergence; that any departure from these ideal conditions must be considered as an anomaly and treated as such.

The acceptance of this view was of signal influence in the progress of

Ophthalmology in our City since by logical sequence it led to the correction of all anomalous states, and, very soon, to the discovery of the wide influence of eye strain as a frequent factor in periodical sick headaches and other nervous disorders. Dr. S. Weir Mitchell, then at the zenith of his notable career as a Neurologist, exerted his influence, in a powerful paper, to the promulgation of its importance, and soon the Neurologist and the Family Physician began to refer patients to the Ophthalmologist for the careful study of the eyes as an aid to diagnosis and for the correction by glasses of a possible error of refraction. As a result in a few years, Philadelphia was, with mild irony, designated by oculists elsewhere as the "Spectacled City."

It had, for example, been taught as the accepted view by many observers that with physiologic growth the small Hypermetropic Eye of childhood developed into Emmetropia; and that under the strain of the requirements of civilized life the antero-posterior axis of the Emmetropic globe increased, resulting in axial myopia. Therefore, it was further taught, that the Myopic Eye was an adaptation to the requirements of civilization. In Philadelphia, however, it was early recognized as a sequel of pathologic states of the uveal tract, and before 1880 numerous cases had been published where hypermetropic refraction had been observed after careful scrutiny to pass over into myopia through the turnstile of astigmatism, in every case accompanied by the pathologic conditions which characterize the Myopic Eye, i. e., the atrophic absorption crescent at the temporal margin of the optic nerve. Furthermore, it was discovered that the careful correction of the preceding hypermetropic astigmatism not only relieved the syndrome of asthenopia, but arrested pathologic states of the *fundus oculi* and prevented the occurrence of myopia.

The contrast between the views then entertained as to the dioptric system of the eye and our present understanding, illustrates forcibly the progress which has been made in a single generation. The contrast is no greater, however, than that afforded by many other phases of ophthalmic understanding and practice. For example may be noted the inflammatory affections of the Eye and their relation to bacteriology. The infectious character of gonorrheal ophthalmia had it is true been recognized and fully set forth in Philadelphia by Dr. Hays as early as 1826, as had other forms of purulent ophthalmia, but the nature of the infection was not known.

Our own Professor Leidy with strange prevision, as a result of his marvelous observations on parasitism in 1849, had suggested its probable importance in the etiology of disease; nevertheless, in 1872 and for many years after we groped our way in the study and treatment of the inflammatory affections of the Eye, with no consciousness of the coming light; which even then was faintly spreading from the conning towers of a hundred observatories of science, manned by patient self-sacrificing observers of the phenomena of life:—a light which was to prove our conclusions erroneous and lay bare our ignorance of the etiology of disease and the essential nature of inflammation. The science of bacteriology and its relation to disease were practically unknown.

Mention has already been made that in 1870, soon after their return from Europe, Dr. Norris and Dr. Strawbridge were appointed to lectureships in Ophthalmology and Otology at the University of Pennsylvania, then located on Ninth Street north of Chestnut. Dr. Norris, however, having resolved to devote himself to Ophthalmology alone appointed Dr. Bertolet to take charge of the Diseases of the Ear. Three years later when the University was moved to West Philadelphia and the University Hospital erected, Dr. Norris was made Clinical Professor of Ophthalmology and Dr. Strawbridge awarded the Clinical Professorship of Otology. It was not until 1876 that a reluctant Professorial Staff and Board of Trustees awarded a full Professorship to Ophthalmology with a seat in the Faculty from which to direct or control the policy of Ophthalmic teaching. In April, 1872, a few months only after the establishment of the lectureship in Ophthalmology at

Ninth and Chestnut Streets, I received by the hands of the late Dr. Charles Hunter a message from Dr. Norris, whom I had never seen, requesting me to take the position of Chief of Clinic. The opportunity thus offered was eagerly accepted and proved to be the beginning of an unbroken association as teacher and pupil, friend and colleague, destined to continue until the close of his eminently industrious painstaking career. It is with great pleasure I take this opportunity to pay grateful tribute to his memory and to express my sense of obligation to his friendship and example during the formative years of my young professional life.

I have already spoken of the hostility to specialism entertained by the body of the profession in Philadelphia, and of the opportuneness of his return together with his friend Dr. Strawbridge, in 1870. The son of a great Surgeon, his career had been pursued in the best associations of lay and professional life; an alumnus of the University; well endowed intellectually, possessing ample means, and fully equipped for his chosen work in the schools and clinics of Europe; none, not even the most conservative and influential, could gainsay his right to such a choice, assail successfully his position, or criticize his preparation for special work. His personal influence, together with that of a coterie of influential medical friends, and the establishment of the Ophthalmological department in the University proved a powerful factor in placing Ophthalmology in Philadelphia on a sane and lasting foundation.

In 1873 Dr. Wm. Thomson, who had been Assistant Surgeon at the Wills Hospital from 1868 and full Surgeon in 1872, was appointed lecturer on Diseases of the Eye at the Jefferson Medical College, in 1877 Ophthalmic Surgeon to the Jefferson College Hospital, and in 1880 was made honorary Professor of Ophthalmology in the College, and in 1895 full Professor with a seat in the Faculty.

The signal influence of these teaching foundations soon became apparent in Ophthalmological literature, by Philadelphia Ophthalmologists; and in the establishment of numerous Special Clinics at the various Hospitals in the City for the treatment of Diseases of the Eye and Ear. The organization of the Ophthalmological Section of the American Medical Association in 1879, and the founding of additional periodical journals devoted to this special field soon followed. It is interesting to trace the inspiring influence of great teachers in any branch of science. In the science of Medicine and Surgery we have in Philadelphia only to recall the names of men like Leidy, Stille, Agnew, Goodell, Pancoast and Gross, not to mention many others of our revered teachers, and then to review the large groups of men now eminent in their respective branches, who were inspired by their personalities, their enthusiasm and their teaching, to realize the powerful influence they exerted. In Ophthalmology our indebtedness is equally clear. I have already made mention of the illustrious pioneers whose names appear in the annals of the Wills Hospital. I need only to recite the names of the men who found their inspiration under Dr. William F. Norris at the University of Pennsylvania, and that of Dr. William Thomson at the Jefferson Medical College. Their lives and work are a mutual inspiration, a goad to still greater endeavor. They are with us tonight, or are absent doing service in the armies of the Republic on the "far flung battle lines" of Europe caring for those who are injured in the righteous struggle for democracy:—the Divine, and therefore, inalienable right of men to choose how they shall be governed.

From the clinics of the University and Jefferson College sprang forth a group of younger eager men deeply interested in Ophthalmology and soon the literature of the subject grew in rapidly increasing proportions setting forth the results of their observations. At the University Clinic with Dr. Norris as Ophthalmic Surgeon and myself as Chief of Clinic and Assistant Ophthalmic Surgeon were appointed as Clinical Clerks and aids in the order named, Dr. James Wallace, Dr. George A. Piersol, now Professor of Anatomy at the University, Dr. B. Alexander Randall, at present Professor of Otology; Dr. George E. de

Schweinitz, now Professor of Ophthalmology. During these years at the University Hospital Clinic, I gave systematic courses of instruction to Post Graduate Students coming from remote districts showing the increasing demand at that time for such special instruction. At the Jefferson Hospital Clinic were, Dr. Wm. S. Little, as Chief of Clinic; now deceased; Dr. L. Webster Fox, later Professor of Ophthalmology at the Medico-Chirurgical College; Dr. George Friebis, Chief of Clinic; Dr. Howard F. Hansell, who for many years has filled the Chair of Ophthalmology as successor to Dr. Wm. Thomson; and Dr. Wm. M. Sweet, at present Clinical Professor of Ophthalmology at the Jefferson Medical College Hospital, and both Ophthalmic Surgeons to the Hospital.

As a means of expression and for an opportunity for mutual study of clinical experience and comparison of views the Section on Ophthalmology of the American Medical Association was organized in 1879. In 1878 Dr. Albert A. C. Heyl, and the Author of this Sketch were requested by the Board of Managers of the Episcopal Hospital to organize a special department for the treatment of diseases of the Eye and Ear; a large and important service rapidly developed and has been maintained until the present time. It remained under the care of Dr. Heyl and myself until 1883; when on my resignation Dr. B. Alexander Randall, then my Associate in private practice, was appointed Ophthalmic and Aural Surgeon to the Hospital, a post he filled with great industry and success for many years. After his resignation the present incumbent, Dr. G. Oram Ring, then my Assistant Surgeon at the Wills Hospital, was appointed, and has placed in literature many valuable contributions gleaned from the abundant material in the Episcopal Hospital wards and clinic.

Numerous other special clinics were opened at various Hospitals and Dispensaries throughout the City:—at the German Hospital, April, 1881, under Dr. Charles S. Turnbull, where he served as Oculist and Aurist until his resignation in 1914, assisted by Dr. Wm. T. Shoemaker, now in the service in France, and Dr. Edward A. Shumway; at the Pennsylvania Hospital under Dr. George C. Harlan.

An additional and very important adjunct to the teaching and progress of Ophthalmology not only in our City but throughout the Country was the organization of the Philadelphia Polyclinic and College for Graduates in Medicine, early in the Eighties. Upon its staff of teachers we once more find the names which already have appeared in these annals in connection with the teaching foundation of the University of Pennsylvania, the Jefferson Medical College and the Wills Hospital. This Institution was well equipped for courses of Instruction in all branches of Medicine and Surgery by well known teachers. In Ophthalmology there was the large out-of-door service to furnish illustrative material for clinical teaching and this, together with didactic instruction by men widely known brought large classes of Post Graduate students from all parts of the United States, and added greatly to the renown of our City as a center for Ophthalmic teaching. Among these teachers may be mentioned R. J. Levis, John B. Roberts, two of the founders of the School, H. F. Hansell, Wm. M. Sweet, B. Alexander Randall, Edward Jackson, George E. de Schweinitz, Wm. Campbell Posey, Wm. Zentmayer, James Thorington, T. B. Schneideman, Wendell Reber, whose death we have so recently mourned, and the Author of this History, who had a corps of Assistants to aid in giving a carefully arranged course covering the field of Ophthalmology; the clinical feature of this instruction being given also at the Wills Hospital with his Hospital Staff assisting, consisting of Dr. G. Oram Ring, Dr. John T. Carpenter and Dr. James Thorington, the latter conducting also the out-of-door Clinical Service at the Polyclinic and giving instruction in refraction and retinoscopy.

With these must be considered the group of Surgeons who have served at the Wills Hospital as successors to those whose names appear in its early annals, —and who have maintained its reputation as a Mecca for the afflicted and its renown as a school of Ophthalmology and should therefore appear in this an-

nal, Dr. Conrad Berens, Dr. Frank Fisher, Dr. Charles A. Oliver, Dr. Edward Jackson, Dr. William Zentmayer, Dr. William Campbell Posey, Dr. McCluney Radcliffe, Dr. S. Lewis Ziegler, Dr. Paul Pontius, Dr. P. N. K. Schwenk, Dr. Wm. M. Sweet, Dr. Burton Chance, Dr. T. Milton Griscom and the Author of this History who served from January first, 1890, to July, 1917, at which time he tendered his resignation. Added to these are the names of the faithful and able younger men who have as Assistant Surgeons and Clinical Clerks aided their respective Chiefs in the work of the large Clinical Service.

On April fifth, 1893, the College of Physicians of Philadelphia adopted the following resolution: "Whenever fifteen fellows of the College shall, in writing, certify to the President their desire to have organized a section upon some department of Medical Science or practice, he shall, if in his judgment it seems wise, direct the Secretary of the College to announce the creation of such a Section." In accordance with this resolution the Secretary announced the creation of a Section on Ophthalmology, which appears on the notice of the College Meeting for May third, 1893,—dated April 27th, 1893: of its signal value I need not comment to this Company.

I have avoided any detailed analysis of the excellent and painstaking work of this large group of younger men, many of whom are present, not because the enticing temptation to do so did not present itself, nor for any want of appreciation of the great value of their contributions as having accomplished a distinct progress in our knowledge, but for the reason that the work is too recent for historical perspective. The things upon which we now set value because they seem to us to be true, may not be so regarded by a succeeding generation of observors. Our science is not a mathematical one. Then too, if indeed they prove to be true they will gain increasing lustre with the flight of time. It may be safe, however, to briefly outline the subjects which seem to your historian worthy of record as having been pressed forward in our City.

Of primary importance among these are:—(1) The claim that the Emmetropic Eye must be regarded as the standard or model eye by which all other states of refraction are to be compared. (2) The genesis of the Myopic Eye. That it was not due to faulty hygiene in the schools, but to congenital anatomic defects in the eyes of the children. Hence that no child should enter upon school life until the eyes had been examined and these congenital anomalies excluded or corrected, and that out of this discovery a steadily diminishing percentage of myopia has been effected And furthermore, out of these deductions grew the school examinations now so universally adopted. (3) The insistance by Philadelphia Ophthalmologists that the static anomalies of Refraction should be corrected under the painstaking employment of cycloplegics. In this connection should be included the painstaking work of Dr. Edward Jackson and Dr. James Thorington on refraction methods and especially in perfecting Retinoscopy, simplifying its application to the daily routine, and placing the procedure on an enduring mathematical basis. (4) The intimate relationship between affections of the Uveal Tract of the Eye and systemic diseases of the infectious, toxic and nutritional types which affect *pari passu* the cardiovascular tree, the kidneys and glandular system.

That the Uveal disease leading to the impairment or disordered nutrition of the eye stood in intimate etiologic relationship to ocular maladies leading to impaired function:—As for example degeneration of the vitreous body, opacity of the crystaline lens, increased tension of the globe. Our present understanding of the conditions thus briefly outlined has been gained step by step; here a little and there a little, now and again glimpses of the truth, fortified and extended by numerous and continued painstaking observations until they became accepted as the foundations for practice and have largely been gained through the published original observations of members of this College. As in Astronomy the observations of a Copernicus, a Kepler, and a Galileo were required before the discoveries of Leverier or the generaliza-

tions of a Newton were possible; so in Ophthalmology, many things in the realm of bacteriology and pathologic histology, with the significant role played by anatomic anomalies over the function of the eye, were to be discovered before we could rest upon the generalizations of the present.

BOOKS ON THE EYE.

It is highly fitting that to this general statement of progress in our City should be added some reference to the permanent literary work emanating from the pens of Philadelphia Ophthalmologists. (1) Early among these productions was a valuable article on "Medical Ophthalmology" by Dr. Wm. F. Norris, in "A System of Medicine" edited by Dr. Wm. Pepper and published in 1885 which was followed by (2) "Systematic Text Book on Diseases of the Eye" by Dr. Wm. F. Norris and Dr. Chas. A. Oliver. (3) A Text Book by Dr. George E. de Schweinitz which has passed through many editions each with careful revision and extensive additions to meet the rapid advance in Scientific Ophthalmology. (4) A large treatise edited by Dr. Wm. C. Posey and Dr. Wm. G. Spiller on "The Eye and the Nervous System" appeared 1906. Among the many contributions appeared the following articles by Philadelphia Ophthalmologists:—"Peripheral Affections of the Fifth, Seventh and Cervical Sympathetic Nerves," Dr. Edward Jackson; "Neuroses and Psychoses," Dr. George E. de Schweinitz; "Neuroses Occasioned by Eye Strain; Headache, Neuralgia," Dr. Samuel D. Risley; "General Nervous Disorders Caused by Eye Strain," Dr. Howard F. Hansell; "Exophthalmic Goitre," and "The Physchological Effects of Operation of the Eyes," Dr. Wm. Campbell Posey. (5) "A System of Diseases of the Eye" edited by Dr. Wm. F. Norris and Dr. Charles A. Oliver; an extensive work comprised in four large quarto volumes constituted by requested articles prepared by men in many countries, each of whom had won wide recognition by extended observation and research in the special field to be covered in his contribution to the "System"; thus comprising an authoritative statement of Scientific Ophthalmology to the date of publication.

Many Philadelphians, twelve in all, are contributors to these volumes. Dr. George C. Harlan, "Diseases of and the Plastic Surgery of the Eye-lids"; Dr. John A. Ryder, "Embryology-Development of the Eye Ball"; Dr. George A. Piersol, "The Microscopical Anatomy of the Eye Ball"; Dr. Edward Jackson, "The Dioptrics of the Eye" and "Retinoscopy"; Dr. Wm. Thomson and Dr. Carl Weiland, "Normal Color Perception and Color Blindness"; Dr. I. Minis Hays, "Blindness, Its Frequency, Causes and Prevention"; Dr. Joseph McFarland and Dr. Samuel S. Kneass, "The Microorganisms of The Conjunctiva and Lachrymal Sac"; Dr. Samuel D. Risley, "School Hygiene"; Dr. Wm. F. Norris, "The Diseases of the Lens"; Dr. Chas. A. Oliver, "Ametropia, Its Etiology, Course and Treatment"; Dr. George E. de Schweinitz, "The Toxic Ambloypias." In addition several of the articles by foreign contributors are translated into our language by Philadelphia Colleagues; Dr. William Zentmayer and Dr. Thomas H. Fenton. There is also the valuable treatise on "Muscular Anomalies of the Eye" by Dr. Howard F. Hansell and Dr. Wendell Reber, published in 1908, which has passed to its second edition with revision and extension in 1912.

Thus briefly I have traced the Rise and Progress of Ophthalmology as a special branch of Medicine and Surgery in Philadelphia. Your Historian has been deeply impressed by many circumstances during the progress of his study but chiefly by his faulty memory of events which came under his observation and regrets that he had not kept a journal. If he were a sculptor desiring to idealize history, he would not depict a mythical female figure seated upon a globe with pen and scroll recording events as they transpire—but rather a mystic, virile figure—standing at the land's end, his feet lapped by the ebbing tide, his eager expectant face aglow with the purple and gold of the closing day and with silver trumpet to lips. Calling! Calling! Calling into the darkening mists:—Calling to deaf ears for an answer from lips, Alas! forever still.

A COMPOSITE OPHTHALMIA NEONATORUM LAW.

By Thomas Hall Shastid, LL. B., M. D., F. A. C. S.

SUPERIOR, WIS.

In the writer's article for the American Encyclopedia of Ophthalmology, Vol. IX, p. 7138 ("Legal Relations of Ophthalmology") occurs this passage: "Among the most important of the first named enactments are those relating to the prevention of blindness from *ophthalmia neonatorum*. These are of Cleopatra-like variety—long, short, foolish, wise, and every one imperfect.... There is...scarcely a single law which does not show forth some valuable provision. On the other hand, there is scarcely a statute which does not exhibit some serious hiatus or fundamental misconception of the situation which it is the object of the law to improve. Some statutes place the entire matter in the hands of the State Board of Health. Others are founded wholly upon the mistaken supposition that blindness from the disease in question is forever due to a fault on the part of an ignorant midwife. Others require, and properly, that physician or midwife, whichever has been in attendance at the birth, shall report all cases of 'inflammation of the eyes' to a public official—for example, 'the parish health officer,' the drawer of the bill having apparently believed that, the case once 'reported,' the eyes would get well of themselves. The most important provision of all is, in fact, almost universally omitted—i. e., the provision that whoever presides at a birth—whether midwife or physician—*shall use the Credé drops*, and thus render unnecessary the making of any sort or kind of report or the institution of any sort or kind of treatment."

It has lately seemed to me that, inasmuch as the situation is precisely as reported above, and inasmuch as, furthermore, to my knowledge, no scientific or legal committee, or even an official of any legal or medical association has taken any step or steps looking toward the securement of efficient and uniform legislation concerning the disease in question, that I myself would venture (with however much of diffidence) on the drafting of a law which should meet, as far as I could make it do so, the actual requirements of the situation, and which, furthermore, should in greater part be compounded of the best of all the features to be found in the present laws in the various states of the Union.

I therefore present hereunder, in full detail, not indeed what I should have the temerity to entitle a "model" ophthalmia neonatorum law, but a *composite* ophthalmia neonatorum law, in which, so far as reasonably possible, the very language now of one and now of another section of some already existing law is made use of, and I earnestly entreat from the readers of the Journal their candid and thoughtful attention to the proffered draft—to the making of which I have given much time and care. If I regarded the study of the legal side of ophthalmia neonatorum as merely an amusing speculation, I would not, in these days of heavy business and sorrow, have occupied the time either of myself, or of any others, with it. At all events, our present ophthalmia neonatorum laws, fragmentary and hastily constructed as they are, for the most part

"Play such fantastic tricks before high Heaven
As make the angels weep."

PROPOSED FORM OF LAW.

An Act for the Prevention of Blindness, Imposing a Duty Upon All Physicians, Midwives, Nurses, or Other Persons Having the Care of Infants, and Also Upon Health Officers, and Fixing Penalties for the Neglect Thereof.

Section 1. Be it enacted by the people of the State of ——— Represented in the General Assembly:[1] That any dis-

(1) The title of the act and the enactment clause should be made to conform to the requirements of the individual state.

eased condition of the eye or eyes of any infant in which there is any inflammation, swelling or redness in either one or both eyes, either apart from or together with any unnatural discharge from the eye or eyes, at any time within two weeks after the birth of such infant, shall, independently of the nature of the infection, be known as ophthalmia neonatorum.

Section 2. It shall be the duty of all physicians, midwives, nurses, or other persons in professional attendance upon a birth, to instil, in all cases, into the eyes of the infant (excepting only if it shall be stillborn) one of the following prophylactic preparations against ophthalmia neonatorum, and in the manner indicated:

1. Two drops and no more of a one per cent solution of nitrate of silver in distilled water, kept in a dark amber, or dark blue, bottle, and not more than three days old.

2. Two drops of a twenty-five to forty per cent solution of argyrol, absolutely fresh.

Two drops of a twenty-five to forty per cent solution of protargol, absolutely fresh.

In every case the prophylactic is to be instilled into both[2] eyes, and, if possible, within one hour after birth. The lids must be held apart, and the medicine dropped upon the eyeball between the lids.

Section 3. Should the eyes of any infant become afflicted with ophthalmia neonatorum (as above defined) it shall be the duty of all physicians, midwives, nurses, or other persons having charge of such infant, to report, within six hours after the discovery of such disease, to the local health officer (or if there be no local health officer then to the State Board of Health) the fact of such disease, stating the names of the parents, their address, and the age, and, if possible, the name, of the infant. And, if the person in charge be a physician, he shall, forthwith, notify the parents of such infant, or anyone standing *in loco parentis* to such infant, of the danger to the eyes of such infant and of the necessity for skilful and continued treatment, of the contagious character of the disease, and of the proper methods for preventing contagion. In case the person in charge is not a physician, it shall be the duty both of such person and of the local health officer, or the State Board of Health, immediately upon the receipt of the report to him or them, to notify the parents of said infant, or anyone standing *in loco parentis* to said infant, of the danger to the eyes of said infant from the disease in question, and of the necessity for skilful and continued treatment thereof, of the contagious character of said disease and the proper methods for preventing contagion. And if the parents of such child shall not be able to pay for medical services, they shall be directed by the health officer to place the child in charge of the city or township physician.

Section 4. Upon receipt of a report of a case of ophthalmia neonatorum, the local health officer shall immediately write on the report the date and hour of the receipt of the report, together with his own signature, and shall make a permanent record of the case for the use of the local health department. The original written report shall be thereafter forwarded at once by mail to the State Board of Health.

Section 5. Every physician, midwife, or other person in professional attendance on a birth, shall state plainly on the birth report what preventive for ophthalmia neonatorum was used, and within how many minutes or hours it was used after the complete birth of the child.[3]

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(2) A physician who brought to me a case of ophthalmia neonatorum (for the existence of which he was himself, as accoucheur, responsible), expressed sincere surprise when informed that the prophylactic ought to have been instilled into both eyes. He had thought, he said, that the drops, placed in one eye only, would be absorbed sufficiently to render the entire system immune, etc. A statute can hardly be too specific.

(3) The Vital Statistics Law (or the Resolutions of the State Board of Health which are made under the authority conferred by such law), should require that all births be reported within, say, forty-eight, or seventy-two, hours. This, is, in fact, done by the Resolutions of the Wisconsin State Board of Health.

Section 6. Every physician in this State who shall treat[4] any infant's eyes for ophthalmia neonatorum, shall, within forty-eight hours after said physician ceases treatment of or attendance upon such case of ophthalmia neonatorum, report to the local health officer (or, if there be no local health officer, then to the State Board of Health) the fact that said physician has treated a case of such disease, giving names of parents, or any person standing *in loco parentis*, stating when the presence of the disease was first observed, when the first treatment was given, when the last treatment was given, that he has now ceased treatment of the case, or attendance upon it, and what the condition of the infant's eyes was when last he saw them. And such local health officer shall send a copy of such report to the State Board of Health within ten days from the receipt of the original of such report by him.

Section 7. The State Board of Health shall furnish, free of cost, to physicians and midwives, registered under the laws of this State, such of the prophylactic substances mentioned herein as it may deem best for the prevention of ophthalmia neonatorum, together with such instructions as it may deem necessary for the proper administration of the same, not in conflict with any of the provisions of this Act.[5]

Section 8. To carry out the provisions of this act there may be expended annually from the treasury of the State a sum not exceeding ———— thousand dollars.

Section 9. It shall be the duty of all maternity homes and all hospitals or other places where women resort for purposes of childbirth, to post and keep posted in conspicuous places in their institutions, copies of this Act, and to instruct persons professionally employed in such homes, hospitals and places, regarding their duties under this Act, and to maintain records of cases of ophthalmia neonatorum in the manner and form prescribed by the State Board of Health.

Section 10. All reports and records made under this Act shall be kept from the public, and shall be privileged information, except only in criminal prosecutions.

Section 11. It shall be the duty of local health officers and of the State Board of Health to report any and all violations of this Act to the prosecuting attorney of the district wherein such violation may have been committed, and to assist such official in every way possible, such as by securing necessary evidence.

Section 12. Any misstatement or concealment of any facts which, under this Act, are essential, shall constitute a misdemeanor, and any person, on conviction thereof, shall suffer the same penalty as is hereinafter provided.

Section 13. Any person violating any of the provisions of this Act shall be guilty of a misdemeanor, and shall, upon conviction thereof, be fined not less than ten dollars, nor more than one hundred dollars, or be imprisoned in the county jail for three months, or both so fined and imprisoned, in the discretion of the court.

Section 14. It shall be the duty of the state's attorney of the district in which any violation of this Act shall be committed, to prosecute for such violation.

Section 15. Whereas, about thirty per cent of all blindness is caused by ophthalmia neonatorum, and whereas the disease may always be prevented, and almost always cured in its incipiency (its damage to the sight being therefore due, as a rule, to ignorance or carelessness); and whereas an emergency exists, therefore this law shall be in force immediately after its passage and approval.

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(4) When the prophylactic has been used, and properly, there is, of course, no need for any treatment. But the prophylactic is far from being always and properly employed: hence the necessity for this and certain other sections of this Act.

(5) It would seem to be wise to allow to the State Board a right to choose the preventive which it will furnish. The person in professional attendance on the case, however, should himself be allowed a certain latitude of choice—i. e., as among the three preventive solutions above-mentioned.

DEVELOPMENT OF THE ANTERIOR CHAMBER IN THE HUMAN EYE.

(Sullo Sviluppo Della Camera Anteriore Nell'Occhio Umano.)

PROF. SPECIALE-CIRINCIONE. ROME, ITALY.

Abstract-translation from Annali di Ottalmologia e Clinica Oculistica, 1917, pp. 161, 249, by William H. Crisp, M. D.

The study of the formation of the anterior chamber in man has not often been attempted, and has never hitherto been completed, since the data reported are more or less fragmentary, do not establish the period at which the formation of the anterior chamber commences, and do not at all explain the mechanism by which it makes its appearance.

The necessity of using the material for other researches has led to the use of a technic in which alcohol in various concentrations is employed for hardening the eyeballs. This results in wrinkling of the tissues, so that the preparations thus obtained are incapable of giving an exact criterion as to the conformation of the anterior chamber in the various stages of fetal development.

Speciale-Cirincione has therefore resorted to the freezing of small very fresh eyeballs, so as to leave unchanged the relations of the various parts. Since this method renders the preparations unsuitable for other researches he has made parallel preparations by the ordinary technic (fixation in corrosive sublimate or in Zenker's fluid, and graduated hardening with alcohol, from ten percent to absolute).

One essential part of the study is that relating to the development of the parts limiting the anterior chamber and especially the iridic angle. It is precisely in this region that researches on human fetuses have been very scarce. The paper by Speciale-Cirincione describes the salient points of nine very recent human embryos of the second, and nineteen of the third month, six different stages of the fourth month, five of the fifth, eight of the sixth, six of the seventh, ten of the eighth, and twelve stages of the ninth month and to term. The article is illustrated by a number of beautiful microphotographs, mostly in colors, tracing the various stages of development of the anterior chamber as a whole and of the adjacent parts.

The formation of the anterior chamber is closely connected with the development of the cornea, of the ciliary muscle, of the tissue of the iridic angle, of the iris, and of the pupillary membrane. Of all these parts nothing exists in the first month of embryonic life. At that time the ectoderm situated in front of the optic vesicle shows merely those modifications which lead to the formation of the crystalline vesicle, and when this has already been closed off and then separated from the ectoderm, the latter remains in front of the crystalline vesicle, being in contact with it for a short extent (embryo of 14 mm.).

At the beginning of the second month, there is insinuated between the crystalline vesicle and the ectoderm a layer of large cubic elements, derived from the undifferentiated mesenchyma which surrounds the margin of the optic vesicle; and thus is established a complete separation between the ectoderm and the anterior pole of the crystalline vesicle. This layer of cubic elements (lamina endothelialis), is the first sign of the future deep layer of the cornea. At this stage there are no elements between the ectoderm and the lamina endothelialis.

At a slightly more advanced stage of development (embryo of 20 mm.), there is differentiated in a circular fashion, around the primitive lamina endothelialis, a thickening of the mesenchyma formed of elements resembling those of the lamina, but disposed in several layers, covering the edge of

the optic vesicle. This circular thickening around the lamina endothelialis is called by the author the "endothelial cushion" (in the Italian original "cercine endoteliale," for which the Latin equivalent "pulvinus endothelialis" is here suggested). It has considerable importance in the later development of this region of the eye, since in front of it develops the cornea, while beneath it develop the ciliary body and the iris.

In the same embryos is found, in front of the endothelial cushion and exactly between it and the ectodermic covering of the eye, a short and narrow area of loose mesenchymal tissue in which the elements are sparse and whose nuclei are disposed quite regularly and parallel with the cushion. In embryos a little more developed this loose tissue extends uniformly in front of the cushion and the endothelial lamina, giving rise to the substantia propria of the primordial cornea. At this stage the cornea measures 0.68 mm. in diameter.

The tissue beneath the pulvinus (cushion) which hitherto formed a single mass not differentiated from the primitive mesenchyma, shows in the embryo of 20 mm. a difference from the surrounding tissue, in that it becomes less compact and its elements are often roundish. In section it appears in the form of a triangular area, limited in front by the endothelial cushion, externally by the margin of the optic vesicle, and internally by the anterolateral surface of the crystalline vesicle. The triangular area contains the section of a large vessel of capillary structure, which will later constitute the large arterial circle of the iris. Throughout this triangular area are further encountered numerous other vessels, of which a part, after being insinuated between the endothelial lamina of the cornea and the surface of the crystalline vesicle, constitutes the anterior vascular membrane, already complete in embryos of 28 mm. Other minute vessels take origin from the anterior aspect of the triangular area, together with a few mesenchymal elements, and are continued behind the margin of the vesicle with the posterior vascular capsule of the lens.

Up to this time (the beginning of the tenth week), the margin of the optic vesicle shows few modifications. The completely pigmented external layer has become thicker next to the margin, while the internal layer has remained thin. The whole margin is in contact with the surface of the crystalline vesicle, which tends to become invaginated within the cavity of the secondary optic vesicle. In the successive stages (embryos of 30 to 35 mm.), there is observable a rapid growth of the wall of the optic vesicle, the result of which is the formation, near the margin, of folds which gradually become more numerous and deeper with an accompanying slow displacement of the margin of the vesicle in front of the surface of the crystalline lens.

As the margin of the optic vesicle advances toward the anterior pole of the crystalline lens, it leaves behind the endothelial cushion, and with it the periphery of the cornea, which thenceforward is no longer in correspondence with the margin of the vesicle, but extends further outward, overlapping the margin of the vesicle to the extent of the thickened part of the pigmented layer already referred to, and finishing where the pigmented layer again becomes thin (embryos of 34 to 35 mm.). Between the endothelial cushion and the folds of the pigmented layer is found at this time a dense stratum of mesodermic tissue very rich in vessels, which forms the beginning of the ciliary mesenchyma. The triangular mesenchymal area of the preceding stages is continuous with this ciliary mesenchyma and forms the portion of it nearest to the crystalline vesicle.

When the preparations are not properly treated, one may find at this stage (middle of the third month), the crystalline vesicle separated from the cornea; but there is no doubt that when this condition is demonstrated, we have to do with an artificial product, due to the contraction of the tissues or to mechanical displacement of the crystalline vesicle within the ocular cavity.

Thus are to be explained the findings of Rochon-Duvigneaud, Gabrielides, and Jannulatos, who describe a deep anterior chamber as existing at this stage.

During the third month of embryonic life the difference of extent between the cornea and the opening of the vesicle continues very slight. In embryos of 20 to 30 mm. the cornea measures 0.80 mm., while the opening of the optic vesicle measures 0.73 mm. In embryos of the end of the third month (86 mm.), the cornea measures 2.9 mm., while the opening of the vesicle measures 2.8 mm. The pupillary opening during the third month is thus the same size as the cornea.

The crystalline vesicle, which at first filled a large part of the optic vesicle, by developing more slowly than the latter, remains proportionally smaller. By this time the preterminal or ciliary tract of the optic vesicle comes to be in relation with the equator of the lens, while the margin of the optic vesicle lies between the periphery of the cornea and the anterior border of the crystalline lens. The preterminal or ciliary tract corresponds to the ciliary body and the marginal tract to the primitive iris. The iridic mesenchyma is covered toward the corneal surface by a layer of elements analogous to those of the endothelial lamina of the cornea, which, like the lamina, are continued into the cushion (pulvinus). This endothelial layer of the iris, however, is arrested near the attachment of the pupillary membrane.

The connections between the cornea and the iris become weak where they are covered by the two endothelial layers, one of which constitutes the deep covering of the cornea, and the other the covering of the iridic stroma, so that these are easily dissociated and there is then produced between them a narrow fissure which is filled with a hyalin substance. This fissure may be considered the first beginning of the formation of the anterior chamber, which at this early stage is constituted solely of a space placed in the form of a ring around and in front of the large arterial circle of the iris.

Remembering the more rapid development of the sclerocorneal membrane in relation to that of the crystalline lens, it is easy to understand how the latter structure, becoming relatively smaller, becomes more widely separated at its equator from the scleral membrane and from the limbus, while on the other hand it maintains its intimate contact with the cornea in the whole pupillary region, either because there the curvatures of the cornea and of the crystalline lens differ but slightly, or because the adhesions formed by the pupillary membrane are more solid at this time.

The gradual removal of the equator of the crystalline lens from the sclera and from the limbus determines necessarily the separation of the iridic stroma from the endothelial lamina, favored by the fact that there the two tissues are completely distinct and furnished with an endothelial covering. But the separation stops in the ciliary stroma because there a double endothelial covering is lacking, and on the other hand the pulvinus or cushion acquires solid connections with the stroma.

The penetration of a liquid into this fissure is merely a consequence of and is to be regarded in relation with the presence of the large arterial circle of the iris, which lies precisely beneath this fissure. From this circular vessel comes the liquid which fills the primitive anterior chamber, and this liquid is merely a transudate. This hypothesis is paralleled by the mechanism of formation of the canal of Schlemm, in which may be exactly followed the process of delamination which goes on between the superficial layers of the endothelial cushion.

In fact, a little while after the formation of the primitive fissure of the anterior chamber (in the first half of the fourth month), there appear one or more spaces situated in front of the endothelial cushion, at the boundary between the more superficial layers of the cushion and the scleral layers. It is worth noting that in the lumen of the canal of Schlemm, in distinction from what is found in the primitive fis-

sure of the anterior chamber, there are frequently encountered red globules, although this finding is not constant.

At the end of the fourth month we have therefore the cornea well developed, with a deep lining formed centrally of the endothelial lamina and peripherally of the endothelial cushion. The ciliary body is morphologically well distinguished by its rich mesenchyma and the characteristic folds of its covering. The compact crystalline lens assumes the aspect which is later proper to it. The canal of Schlemm has also already been formed. It may be said in short that the whole anterior segment of the globe is already completely outlined in its essential parts. Merely the iris, and with it the anterior chamber, are relatively very rudimentary.

Towards the middle of the fourth month the distance between the two opposite sides of the large arterial circle of the iris (to which corresponds the sinus of the anterior chamber), is 4.1 mm., while the distance between the two opposite borders of the optic vesicle is 3.86 mm. The little iris has therefore merely a width of .14 mm. It presents at this time, in correspondence with the pupillary margin, a little strip of epithelium (sphincter muscle), and a stroma. At this stage the anterior chamber maintains the aspect of a circular fissure and measures 0.13 mm.

From the fourth month onward, during the fifth, sixth, and seventh months, the ocular fissure with which the anterior chamber commences gradually increases in size, corresponding with the increase in surface of the iris. Thus it reaches 0.70 mm. at the end of the fourth month, 0.80 mm. at the end of the fifth month, 1.5 mm. at the end of the sixth month, and 1.9 mm. at the end of the seventh month. The pupillary membrane is at this time still adherent to the endothelial lamina of the cornea. During the sixth and seventh months the adhesion is however so delicate that separation of the crystalline lens from the cornea is possible by the mere fact of the use of alcohol, which accounts for the great difficulty of obtaining at this stage eyeballs in which the pupillary membrane is not detached from the cornea, at least over extensive areas. Thus are explained the results of Seefelder and Wolfrum, who placed the complete development of the anterior chamber in man in the sixth month of intrauterine life.

At the beginning of the eighth month the pupillary membrane shows a diminished richness in vascular loops; which are completely lacking in the central portion, corresponding to the anterior pole of the crystalline lens. The lamina which serves as a support to these vessels presents at this period a finely granular aspect and is hard to stain. It is not difficult to find obliterated vessels which are undergoing hyalin degeneration. Toward the middle of the eighth month, in fact, one sometimes finds complete absence of the pupillary membrane, with the result that the anterior chamber, from a circular fissure, is transformed into a complete fissure in the form of a negative meniscus in front of the iris and the crystalline lens, which have become entirely separated from the cornea.

The anterior chamber during the last month of fetal life is complete, but always very shallow, corresponding to the marked convexity presented by the iridic surface and the crystalline lens at these stages. It is only after birth that the anterior chamber becomes deep. Then the anterior aspect of the crystalline lens becomes flatter while the difference of curvature between the cornea and sclera steadily becomes more pronounced.

The trabecular system of the adult human eye is directly derived from the endothelial cushion which is encountered from the beginning of the third month. Some time after the end of the third month the more superficial layers of the pulvinus or cushion are separated by the penetration between them of minute scleral lamellae, and between the superficial lamellae there are produced small spaces which constitute the small spaces of the canal of Schlemm. Slightly before birth the elements of the pulvinus become flat-

tened out and constitute an endothelial covering to the trabeculae which have developed during the last part of fetal life in the form of fibrils in the pulvinus.

At birth the apex of the pulvinus corresponds to the circumference of the elastic membrane of Descemet, the anterior surface corresponds to the canal of Schlemm, and the periphery to the circular scleral layers, while the posterior surface corresponds in one part to the anterior chamber (iridic angle), and in the other part to the ciliary muscle. Thus the sclerocorneal trabecular system is distinguished into two parts, one in relation with the sclera, whose circular lamellae are interlaced with the lamellae of the trabeculae, and the other part in relation with the ciliary muscle, whose fibers are continued in the form of tendinous elements with deeper lamellae of the trabecular system.

OCULAR MANIFESTATIONS OF SPIROCHETOSIS ICTERO-HEMORRHAGICA.

(Les Manifestations Oculaires de la Spirochetose Ictero-hemorrhagique.)

L. WEEKERS, M. D., AND J. FIRKET, M. D.

SURGEONS, RESERVE CORPS, BELGIAN ARMY.

Abstract-translation from Archives d'Ophtalmologie, v. 35, No. 11, p. 647, by M. W. Fredrick, M. D.

The frequent occurrence of this disease in the field, especially in the trenches, has led to a more intense study of it. It appeared in the Belgian army in August, 1916, and the first cases in the French army were described by Martin and Petit in October, 1916. It invaded the armies on both sides in an almost epidemic form. Although the general symptomalogy has been described in numerous publications the eye manifestations have received but passing notice. As few oculists and civilian physicians have had an opportunity of getting acquainted with this disease the authors give a short sketch of its prominent characteristics.

The disease does not always present the same picture; on the contrary, it is polymorphic, varying greatly especially as to severity. Certain symptoms, however, are always present, which allow a positive diagnosis. The usual clinical picture is this: the patient, while in full health, is surprised by chills, headache, pains in the body, pains in the muscles, especially those of the neck, lumbar region, flanks, posterior aspect of the thighs, and legs. Sometimes there is hyperesthesia of the skin, and the eyes pain when they are moved. The temperature rises rapidly to 102° or 104°, where it remains for five or six days. During the first period there is great depression, the pulse is small and weak, but not greatly accelerated; the blood pressure is lowered. Nasal and labial herpes, frequent epistaxis, moderate bronchitis with bloody sputum, a dry, dirty tongue; repeated vomiting of bile. Diarrhea is rare, the stools being, as a rule, formed and colored with bile. Liver and spleen show but little swelling. Traces of albumin and large quantities of urobilin are constantly found in the urine, cylindrical casts are exceptional. About the fourth or fifth day the icterus appears, sometimes light in color, sometimes deepening into a dark yellow or saffron. Soon after the appearance of the icterus the temperature drops to near normal, and the patient improves in every way, except that the urine still retains the abnormal constituents, and besides shows bilary pigment.

After five or six days of apyrexia the temperature again rises, and describes a regular curve with wide daily oscillations during a period of six or seven

days. This recurrence of fever is better borne than the first period, and during its course the icterus disappears. A long convalescence follows, five to six weeks passing before the blood returns to normal. Cardiac collapse is always to be feared. The mortality ranges from four to eight percent.

Towards the end of 1914 the causal organism was first described by Japanese authors (Inadu, Ido, et al.). It is a spirocheta morphologically related to the spirocheta of syphilis, and was first found in coal miners. This discovery threw much light on the etiology of the disease, which had been known clinically for many years under different names: "ictère fébrile à rechute de Mathieu"; "typhus hépatique de Landouzy"; "Weil's disease"; etc. In those cases in which the icterus does not occur the diagnosis can be made by inoculating guinea pigs with the blood of the patient during the first seven days of fever, or by examining the sediment of the centrifuged urine passed after the tenth day, when the spirochetæ will be found. The fifteenth to twentieth day the spirochetae will be numerous.

In fifty cases of spirochetosis icterohemorrhagica the authors found:

No ocular manifestations.....	4 cases
Simple hyperemia of the anterior segment of the eye...	29 cases
Congestion of the iris.....	7 cases
Iritis	6 cases
Iritis and optic neuritis.....	2 cases
Iritis and retrobulbar neuritis.	1 case
Ocular herpes	1 case

The hyperemia is an early symptom, and varies much in intensity. Except in the severe cases, in which there is tearing and photophobia, the patients are not much annoyed by the eye condition. Both ciliary and conjunctival bloodvessels are involved. The hyperemia does not call for any special treatment, as it disappears spontaneously about the time convalescence begins. In the severe cases the instillation of a few drops of atropin is generally sufficient to cause a subsidence of the symptom.

Iridic irritation and iritis are, as a rule, coincident with the recurrence of the fever, sometimes they are late symptoms. In the iridic irritation we have double myosis with unequal pupils due to the difference in the amount of irritation present in the two eyes. This inequality of the pupils sometimes reverses itself. The pupils dilate slowly under atropin, and when dilatation has attained the maximum the anisocoria disappears. Iritis with exudation into the posterior chamber occurred eight times, was generally of a mild character and ended in a complete restitution. Real synechiae are rare. One feature of this iritis is the ease with which the exudate in the posterior chamber can be seen, owing to the small amount of infiltration into the iridic tissue and the thinness of the posterior synechiae, as contrasted with the findings, for example, in syphilitic iritis. Atropin acts much more promptly in the cases under consideration than in other cases of iritis, for the reasons just given. The deposit on the anterior lens capsule, consisting probably of fibrin, disappears slowly, but is completely absorbed finally.

The conditions described in the preceding pages seem to the authors to prove the presence of the spirochetes in the uveal tract. The instillation of atropin for four or five days is advisable, even though most of the cases tend to spontaneous cure.

Of the two cases of optic neuritis one was bilateral. The fundus changes, while not severe, were readily recognizable. There was some lessening of vision, but no retraction of the fields, nor was there a central scotoma. Both cases resulted in a complete cure. The one case of retrobulbar neuritis terminated favorably also in a short time. The authors think the presence of the spirochetes in the cephalo-rhachidian fluid was the causative factor. The one case of ocular herpes occurred early in the disease, and affected the lids, conjunctiva, and cornea. The icterus of the conjunctiva is a part of the general picture, and has, therefore, no local significance. In three cases subconjunctival hemorrhages were seen, being situated towards the inner and outer canthi in both eyes. In no case

was a hemorrhage into the deeper tissues or into the orbit observed. The case reports of five cases are given in detail.

(It is of interest to note that the finding of the Japanese investigators that the field rat is the probable carrier of this infection has been confirmed by Stokes, Ryle, and Tytter, [Lancet, Jan. 27th, 1917], and by Eggstein, [J. A. M. A., Nov. 24th, 1917].

(M. W. F.)

A NEW OPERATION FOR PTOSIS.

ERNEST E. MADDOX, M. D. BOURNEMOUTH, ENGLAND.

Abstract with two illustrations from the British Journal of Ophthalmology, v. 1, No. 6, p. 358, by Charles H. May, M. D.

Few will dispute that ptosis operations, however successful they may be reckoned surgically, rarely quite realize an artist's ideal from the esthetic point of view. Nearly all procedures which attack the levator do so from the skin side, which mode of approach must make for esthetic loss, owing to derangement of so many important structures—skin, areolar tissue, orbicularis, orbital fascia and the extensive strands from the levator. Maddox contrasts this with the simplicity of approach from behind as practiced by Bowman: After double eversion of the eyelid, division of the conjunctiva along the upper margin of the tarsus brings the tendon in view and this can then be shortened without interfering at all with the natural beauty of the front of the eyelid. Mr. Bowman's operation was dropped because too difficult and because the excision of a large piece of the tendon left the door open for possible disaster if the suture should cut out and allow the lid to drop worse than ever.

Bowman excised the posterior or upper edge of the palpebral cartilage

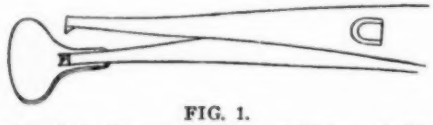

FIG. 1.
Conjunctival Forceps showing Addition of Metal Plate. (Maddox.)

with about half of an inch of the levator inserted into it. Maddox's operation also approaches the tendon from behind but omits excision of the tendon and there is therefore no risk of cutting out of sutures nor are the structures connected with the anterior face of the tendon interfered with.

The operation is described as follows: The only special instrument required is a fine mouse-toothed conjunctival forceps to the tip of one leg of which has been soldered an oval strip of metal transversely. Adrenalised cocain affords ample anesthesia. After effecting the first ordinary eversion the second eversion is made by grasping the extreme apex of the tarsus with the lid evertor, so that the metal plate shall lie against the tarsus, which is then everted the second time, and maintained in position by the weight of the instrument as it lies upon the brow. The whole field of operation thus lies fully exposed. The conjunctiva is now divided along the upper margin of the tarsus. This is most easily done by transfixion with a narrow Graefe knife, after which a pair of scissors reflects the conjunctiva from the tendon so as to leave it fully bared. Its fibres are then seared, with an electro-cautery, in longitudinal furrows from the tarsus to as high up as the case requires.

A central bundle of tendon fibres is grasped with forceps and transfixed by a ring of thread and two similar sutures are placed on either side of the first. Next the apex of the tarsus is to be snipped off with scissors (though for a small effect this can be dispensed with), and the two needles of the central suture, either with or without an intermediate dip into the tendon, are passed solidly through the tarsus side

by side, not too near its cut edge, from the conjunctival surface to the deep surface, and the needles brought out between the parallel threads, so that the knot, when the suture is tied, shall be sunk behind the upper edge of the tarsus without touching the cornea.

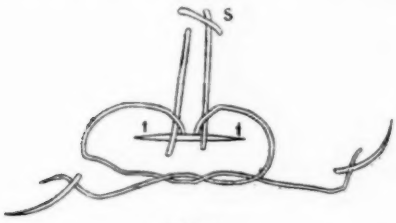

FIG. 2.

Central Suture Before Being Tied. S, Double Turn in Tendon. t, t, Cut Edge of Tarsus. (Maddox.)

Before tying, however, the two lateral sutures are passed through the tarsus similarly, and then all are knotted. Two or three fine sutures to replace the conjunctiva complete the operation. The sutures are left undisturbed for two or three weeks and then easily withdrawn, but with as little stretching of the tendon as possible. The full effect of the operation is sometimes not obtained for three or four months. The final result is generally very pleasing.

No purely posterior operation is, of course, available in the congenital absence of a levator; but in acquired ptosis it always does some good, since even if the levator be completely paralyzed, the mere elasticity of the tissues working against the orbicularis counts for something. A posterior operation can, if necessary, be supplemented by an anterior one, such as Pagenstecher's sutures, to bring the frontalis into play as well.

SHORT ABSTRACTS.

Under this heading are included notices of the most important points of interest that appear in the recent literature which are capable of brief statement. For the systematic review of the whole literature of each subject the reader must consult the "Digest of the Literature," a part of which appears in each number of the journal, and which will be complete within the year. The initials appended to each abstract are those of the collaborator who made the abstract; abstracts made by foreign collaborators or by contributors whose names are not published in the list of collaborators are signed with the abstractor's name.

Lang, William.—Etiology and Treatment of Iritis.—(The Lancet, June 23, 1917, p. 956.) In opening the debate on this subject, the writer pointed out the great advantages which would accrue from the discovery of the cause of iritis in each instance. He had ascertained that in 200 cases of iritis in his private practice the various causes occurred in the following percentages: syphilis, 6; gonorrhea, 12; tubercle, 11; general affections, 8.5; other causes, 25.5; pyorrhea, 37. At one time syphilis was regarded as the chief cause of iritis, and probably hospital figures would show an increase on 6 per cent; but with the modern antisyphilitic methods, he thought it would become the rarest cause, for gummata of iris and ciliary body could be made to melt away without the disorganization of the eye which was formerly seen.

Gonorrhea was not usually considered so potent a cause, but hospital practice would probably show a higher percentage than 12. Until recently Mackenzie's work on gonorrheal iritis had remained unimproved upon. Now, however, that the infection had been shown to linger in the genito-urinary system for years relapses could be largely prevented by local treatment applied in that region. Other sources of infection might complicate the cases of iritis, such as pyorrhea, and produce relapses. The tuberculous cases of iritis were equally divided between the sexes, and the average age of the patients in this form was 25 years, all but two being between 16 and 25 years of age. The treatment of tuberculous iritis, as for tubercle of the lung, appeared to be good air, graduated exercise, and food rich in fats, as well as such local meas-

ures as would subdue inflammation and prevent closure of the pupil.

Of the cases 17 were associated with gout, diabetes, herpes of the fifth nerve, influenza and pneumonia. Ten patients had some septic focus on the skin or on a mucous membrane or cavity. In 6 cases there was disease of tonsils, and 23 patients had an affection of the alimentary tract, while 7 had a diseased condition of the genito-urinary system. One case followed a smart blow on the eye, and another patient had iritis as a sequel of sympathetic ophthalmia.

In no less than 74 of the 200 patients the sole cause found was pyorrhea. When these cases were seen early and the offending stumps or teeth were removed the clearing up of the iritis was strikingly rapid. Of the remaining cases 22 had pyorrhea in association with other diseased conditions. In the cases in which pyorrhea alone was found there were twice as many women as men. Of the total number 48 per cent had their mouths affected, and it would be of great value if members of the dental profession could recommend a preventive of this appalling state of affairs, which seemed to lay the foundation for numberless diseases involving all parts of the anatomy, including the eye.

C. H. M.

Lapersonne, F. de.—Antityphoid Vaccine and Ocular Lesions.—(Archives d'Ophtalmologie, v. 35, No. 11, p. 449). Can antityphoid vaccine produce eye troubles leading up to blindness? A certain number of cases in which this is supposed to have occurred have been recorded, but the author thinks they have little scientific value. Some of them are due to added infection with staphylo-, strepto-, or pneumococci, due to a faulty technic or a latent infection in the subject. In such cases one may find severe purulent irido-cyclitis, necessitating the removal of the eye. In a syphilitic or a rheumatic subject one may have a recurrence of an irido-cyclitis coincident with the injection, such as one often sees in tuberculous subjects after injections of tuberculin, or after the ocular reaction to tuberculin, or as one sees in syphilitic subjects after the injection of the arsenical preparations.

Such is also the case when a secondary glaucoma asserts itself after the use of the vaccine, as the author cannot understand how the vaccine can produce such a result a month or more after the injection, especially when the injection was not followed by a rise in temperature. A primary glaucoma may make its appearance at the same time as the injection is given, but the causal connection is just as doubtful as in the case of a secondary glaucoma. The conclusion arrived at by the author is that an ophthalmoscopic examination should precede the injection of the antityphoid vaccine, and that syphilitics, arthritics, and tubercular subjects should not receive the injection, especially when they are more than thirty-five or forty years old.—M. W. F.

Shahan, W. E.—Corneal Thermotherapy.—(American Journal of Ophthalmology, Nov., 1917, p. 321). The writer refers to experiments which he made on lower animals in studying the effects of high temperatures upon the eye and which he reported at the 1916 meeting of the A. M. A. He continued these experiments and studied especially the effects of higher degrees of heat upon pneumococcus ulcers of the eyes of rabbit. Next he applied this knowledge to the treatment of corneal ulcers in man.

Up to the present time, thirty-two cases of serpiginous ulcers of the cornea, hypopyon keratitis of pneumococcus origin, have been treated and the results have been so uniform and positive, that the method can be said to be very nearly specific. There was rapid cessation of clinical symptoms and steady replacement of destroyed tissues, and the visual acuity finally obtained in these cases ranged from perception of light where very nearly the whole of the corneal surface had been destroyed before the thermal treatment was used to full normal where the treatment was used before the onset of severe iritis.

The mode of application is as follows: After anesthesia and bleaching by means of several instillations of 5 percent cocain in 1:2000 adrenalin, the applicator is placed upon the corneal ulcer and held there one minute. The extremity of the applicator should be of a size to cover the ulcer exactly; it is heated exactly to 158 degrees F. by a special contrivance. There will be no pain during the application but there will be some for a few hours afterwards. C. H. M.

Masuda.—Acute Disseminated Choroiditis with Scrofuloderma.—(Nippon Gankakai Zasshi, January, 1917).

In a fifteen year old scrofulous patient, who likewise had hemorrhagic nephritis, there was a suppurating lymphatic gland of the neck, which had partly cicatrized and had given rise to typical scrofuloderma in its neighborhood. Chemosis and swelling of the eye-lids appeared on each eye, which was accompanied by dull pain. Ophthalmoscopic examination showed pale yellowish spots, which were more or less round, and a few of which were the size of the papilla. These spots were not accompanied by pigment and lay under the retinal vessels. They were more frequent in the equatorial zone leaving the neighborhood of the papilla and macula free. The affection was more pronounced in the R. eye than in the L. It was interesting to note that the fundus disease appeared and proceeded with the swelling of the eyelids. The author thinks that this form of choroiditis has not yet been described, and calls it acute disseminated choroiditis with scrofuloderma.

KOMOTO.

SOCIETY PROCEEDINGS.

SECTION ON OPHTHALMOLOGY, COLLEGE OF PHYSICIANS OF PHILADELPHIA.

OCTOBER 18, 1917.

DR. S. LEWIS ZIEGLER, Temporary Chairman.

Operation for Contracted Socket.

Dr. P. N. K. SCHWENK showed a case of contracted socket in which he devised a new feature of transplanting a flap with a pedicle. The first step was a canthotomy. The conjunctiva was then undermined to the margin of the lower lid, and the skin loosened 6 mm. downward. The conjunctiva was brought into the cavity and held there by two hairpin sutures through the lower lid and tied over two pearl buttons. A large flap twice the width of the denuded conjunctiva was taken and placed in the orbit, suturing the lower part of the flap to the lower edge of the conjunctiva and the upper part to upper edge. The flap was placed into the canthotomy angle, then the ends of canthotomized lids were united over the pedicle by a strong hairpin suture tied over a pearl button. The edges of the area from which the flap was taken were then united and a conformer was inserted. The sutures were allowed to remain seven or eight days.

Relation Between Eye and Ear as Shown by Bárány Tests.

DR. ISAAC JONES and DR. H. MAXWELL LANGDON said that knowledge of the relation between the ear and the eye was first recognized in 1825, when Fleurens noticed that excision of portions of the labyrinths of animals caused ocular movements and disturbances of equilibrium. At the same time, Perkinge produced nystagmus and vertigo by turning human beings. Robert Bárány has elaborated and made practical application of the field of knowledge thus opened.

The ocular mechanism depends on ear stimuli for precision of movement and steadiness of fixation. Impulses from the right ear tend to draw both eyes to the left and impulses from the left ear tend to draw both eyes to the right. Interference with the normal

functioning of the ears results in nystagmus. Bartels makes the statement that in rabbits ocular movements depend entirely upon stimuli from the ears and section of the acoustic nerves produces complete loss of eye movements.

It is now definitely known that the ear consists of two organs of distinct and separate function: the cochlea, which is the organ of hearing, and the vestibular labyrinth, which is the sense organ of balance. The balancing portion of the ear consists of two tiny sacs known as the utricle and saccule, and of three semicircular canals. The utricle recognizes movements in an anteroposterior direction and the saccule movements in a lateral direction. The semicircular canals detect rotary movement of the body in all planes.

The new ear tests consist of stimulation of these semicircular canals by either turning the patient in a chair, douching the ears with hot or cold water, or by the use of the galvanic current to the ears, producing a rhythmic nystagmus and vertigo; for example, turning the individual ten times to the right in twenty seconds, with the head upright, stimulating both horizontal semicircular canals, produces a horizontal nystagmus to the left, subjective sensation of turning to the left and "past-pointing" to the right. (By past-pointing is meant the inability to find with the eyes closed a a spot, which the finger has previously touched, the arm being kept stiffly extended, having been raised above the head and again lowered.) Turning in a chair produces these phenomena by mechanically causing a movement of the lymph in the canals. Douching with hot or cold water produces this circulation of the lymph by changing its specific gravity.

Based on a study of several hundred clinical cases and a considerable number of operations and autopsies, it is believed that the following are the pathways over which these stimuli are transmitted to the eyes to produce the nystagmus and to the cerebrum to produce the vertigo.

Drs. Langdon and Jones have brought out certain facts in regard to these pathways, some of them definite, others needing further analysis. Our present belief, in fact, is as follows:

1. The fibers from the horizontal semicircular canals pass through the VIII nerve, enter the brain-stem at the junction of the medulla oblongata and pons and continue directly to Deiters's nucleus and there divide into two pathways.

(a) The vestibulo-ocular tract concerned in the production of the nystagmus. These fibers go from Deiters's nucleus to the posterior longitudinal bundle, through which they pass to the various eye muscle nuclei, from which through the III and IV nerves they are distributed to the eye muscles themselves.

(b) The vestibulo-cerebello-cerebral tracts responsible for the vertigo. From Deiters's nucleus this path enters the cerebellum through the inferior cerebellar peduncles to the three vestibular cerebelli nuclei of the same side, from which it proceeds upwards through the superior cerebellar peduncle and continues to the cerebral cortex from both sides, but more particularly the opposite side, through the crura cerebri. The cortical areas which receive these fibers are postulated by Mills to be in the posterior portion of the second temporal convolutions, adjacent to the cortical areas for hearing.

2. The fibers from the vertical semicircular canals have a very different course; after passing through the VIII nerve they immediately ascend into the pons and at a point above the middle of the pons they have a division into two pathways similar to the division of the horizontal canal fibers at Deiters's nucleus.

(a) The vestibulo-ocular tract, the fibers entering the posterior longitudinal bundle, to be distributed to the eye muscle and finally to the eye muscles themselves.

(b) The vestibulo-cerebellar-cerebral tract reaches the cerebellum through the middle cerebellar peduncle, entering the cerebellar nuclei of the same

side; from this point the pathway is identical to that of the fibers from the horizontal canal, through the superior cerebellar peduncle to the cerebral cortex of both sides.

The internal ear and these intracranial pathways constitute our conception of the "vestibular apparatus," and a knowledge of this is of use to the ophthalmologist in the study of ocular palsy and spontaneous nystagmus.

Epithelioma of Lid and Cheek, Methods of Cure.

Dr. G. Oram Ring exhibited a male patient, aged sixty-five years, from whose lower right lid he had removed an extensive epithelioma by ordinary surgical means, the denuded area having been covered by an epithelial graft from the forearm.

The operation was performed fifteen years ago. The grafts adhered perfectly and the lid remained normal in appearance until two months ago. The cicatrical ectropion now present is the outcome of a plaster treatment applied by a so-called "cancer doctor" to an epitheliomatous splotch on the cheek, which developed about eight years ago after the lid operation. The splotch referred to had been treated by an expert roentgenologist for several years, mainly by X-rays and for some months with radium, to no purpose. The plaster accomplished the eradication of the disease in two months when well-known forms of radiant energy had failed after several years of trial, but with an unfortunate cicatricial contraction of the lower lid.

The ingredients of the plaster were arsenic, sulphur, eupatorium feniculoides, or dog fennel, and ranunculus, or crowfoot. The quantities and method of application were detailed. Dr. Ring's purpose in presenting the case was not to advocate the use of the plaster, notwithstanding its merit, but to insist upon a less dogmatic adherence for so long a period to a method which had clearly failed.

A prompt and satisfactory result could have been accomplished in Dr. Ring's judgment, by the application of the method of electrothermic desiccation, with which the profession in Philadelphia has been made familiar, especially by the work of Dr. W. L. Clark. It was felt that the bloodless devitalization of malignant disease of the type referred to could be accomplished with promptness, certainty and precision by the desiccation method, thereby minimizing the cicatricial complication.

Discussion—Dr. William L. Clark said he appreciated the invitation to discuss the respective merits of the various methods practiced for the treatment of epitheliomas. His experience, covering a period of ten years, had been such that he had formed well-defined conclusions upon the subject.

The methods considered were operative surgery, chemical caustics, thermocautery, roentgen rays, radium and the desiccation methods. The class of epitheliomas were confined to those of basal cells or rodent ulcer type, especially those appearing upon the eyelids and adjacent parts. The keynote of success, so far as permanency of cure is concerned, was the thorough destruction of the local lesion by whatever means employed, by one treatment, for he considered it folly to allow any malignant tissue to remain after starting treatment, for there was danger of stimulation of the growth by so doing.

Nothing more was necessary in the class of epitheliomas under discussion, as they are of relatively low-grade malignancy, progress slowly, and seldom if ever metastasize. Another factor of importance, in addition, is the cosmetic result, and in choosing a method for the treatment of a given case the one that combines an equal chance of cure together with a good cosmetic result should be selected.

Operative surgery is efficient if performed radically, but the cosmetic result leaves much to be desired. Secondary plastic operations often improve this condition, but more often fail. Operative surgery has the added disadvantage of opening blood and lymph channels, favoring recurrence. The best argument against operative surgery in the treatment of these

lesions is the fact that cases are being continually referred for other treatment by the highest exponents of the art of ophthalmic and general surgery.

The use of chemical caustics, such as nitrat of silver, phenol, etc., is most reprehensible, as they serve only to stimulate the growth. Pastes of arsenic or zinc chlorid are often successful, however, when used by physicians experienced in their use; but the results are by no means constant, and even in the hands of experienced men, failures are frequent. The reason for the failures can be readily seen. The depth of destruction cannot be accurately determined, and if one malignant cell is left remaining, recurrence is certain. The application is painful, there is danger of applying pastes on the eyelids, and there is frequent unnecessary scarring. When a good result was obtained it was a matter of luck.

Thermocautery is superficial in action, tends to stimulate the lesion and produces a contracted scar. Its use should be condemned. This applies either to the thermocautery or electrocautery.

The roentgen rays are successful in a fair percentage of cases, and when they are successful the result is ideal, both from a curative and cosmetic standpoint. The results, however, are by no means constant, and from Dr. Clark's own experience and observations from the experience of the best roentgenotherapists he believed that there was a tendency to recur in a large percentage of cases sooner or later unless treated very early. It also has been observed that when the roentgen rays are used to the limit and fail that the tissues are in worse condition than before treatment, and because of this lowered vitality, less amenable to other treatments. More than one X-ray treatment is usually required, and often the lesion is stimulated instead of retrogressing. There is also some danger to the eye in treating epithelioma of the lids.

The same objections apply to radium as to the X-rays, although often good results are obtained by them both.

The desiccation method is one which embraces the advantages of all and has none of the disadvantages of the methods mentioned. The X-rays and radium may, however, be used in some cases in conjunction with desiccation to advantage. It destroys the lesion thoroughly to any depth desired, and the control is so accurate that the smallest discernible point may be treated without danger, even on the cornea. Lesions may be destroyed with one treatment, blood and lymph channels are sealed at once, and there is no resultant contracted cicatrix. There is a minimal amount of destruction of normal tissue. The percentage of recurrence computed from 150 cases of epithelioma of the eyelids, one year or more, is less than 3 per cent.

From a curative and cosmetic standpoint, Dr. Clark believed that there was not doubt that the desiccation method is far superior to any method known at the present time for the treatment of basal-cell epitheliomas of the eyelids and adjacent parts.

J. Milton Griscom,
Clerk.

COLORADO OPHTHALMOLOGICAL SOCIETY.

November 17th, 1917.

Dr. Edward Jackson, Presiding.

Glaucoma Secondary to Perforating Corneal Ulcer.

Dr. G. F. Libby presented a boy of 12, first seen by him 7½ years before on account of a suppurating ulcer of the right cornea, with hypopyon and iritis. The ulcer had perforated, healing slowly under the usual treatment, with a resulting leucoma adherens.

The child was not seen again until Nov. 2, 1917; and then only by chance. No history of further ocular disturbance was recently obtainable from his father. Examination revealed a thin leucoma in a cornea 13 mm. in diameter as compared with 11½ mm. for the fellow eye, pupil moderately dilated, deep anterior chamber, the old anterior synechia absent, two pigment deposits on the capsule, clear lens and vitreous, with a deeply excavated optic

nerve, showing gray atrophy. To palpation the tension seemed to be normal or slightly lowered. A week later the tonometer registered 15 mg. of Hg. R. V. = barely light perception. L. V. = 5/4.

The patient has been a delicate, hypersensitive child; and although fairly well at present, is of the substandard type. The eye is quiet except when disturbed by manipulation or exposure to intense light.

Discussion.—Dr. D. A. Strickler asked if the anterior synechia were extensive in this case. Dr. Libby answered in the negative. The anterior synechia were successfully broken up by atropin.

Dr. J. A. Patterson said this case was perhaps not easily managed, and the patient may have continued the atropin too long after healing of the perforating injury, especially since the case was not seen for 7½ years.

Dr. E. M. Marbourg spoke of one case he has seen in which the atropin broke up such adhesions very easily.

Dr. O. Orendorff asked when the vision had failed, also whether or not the glaucoma was congenital.

Dr. G. F. Libby replied that the glaucoma is not congenital as the cornea had a normal diameter for each eye, and the two eyes were equal when he saw the patient 7½ years ago. He knew that repeated examination of this boy 7½ years ago then absolutely excluded glaucoma. He furthermore stated that the atropin was stopped at the close of the inflammation following the perforating injury and could not have been used by the patient after stopping treatment. However, the dionin was continued for some time afterwards.

Dr. Jackson said he would watch to see what the eye will do, until the period of hypertension is over and the overgrowth of the eye is at an end. The boy is now too old for buphthalmos. If the disease is not progressive, he would let it alone. If it becomes progressive at any time, or shows at the end of six months that it is progressive, he would operate. Eserin should be used, even if the tension is normal or subnormal. There may be intermittent rise of tension.

Retinal Arteriosclerosis.

Dr. J. A. McCaw presented a man, age 58, who formerly had a blood pressure of 180, and a few casts in the urine. The blood pressure has been reduced to 168. When first examined in the clinic, he had large and small retinal hemorrhages, seen as a rosette.

Discussion.—Dr. Edward Jackson said he found new formed retinal vessels when he examined this patient at the clinic.

Vision After Congenital Cataract.

Dr. Edward Jackson presented a boy of fifteen who had suffered from congenital cataract, operated on when he was about 10. By repeated operations, a fairly clear pupil was obtained in the left eye, with some small areas of fundus reflex in the right. He had lateral nystagmus of 2 or 3 mm. He was wearing right and left + 8 Sph. lenses, which gave him light projection in the right eye and vision of 0.08 in the left. It was considered improbable that further operations would improve his vision. However, by giving him + 18 Sph. lenses, mounted one inch in front of the cornea, he was able to read type, visible to the normal eye at 0.75 m.; that is, type about as small as he would encounter in newspapers or books. The points emphasized were: the poor vision often obtained in cases of congenital cataract, because of other defects in the eye; and the great practical benefit, even with poor vision, of properly adapted lenses.

Discussion.—Dr. J. A. Patterson said these cases need further help by refraction. He spoke of a case operated upon by the late Dr. Noyes, of New York City, while the patient was a babe. He saw the patient in early manhood. He had a limited field, but this improved by compelling him to use his eyes.

Dr. F. R. Spencer spoke of a young man who had been very successfully operated upon by Dr. D. H. Coover for congenital cataract, and who obtained

normal vision with his correcting lenses, although he had never been able to wear toric lenses satisfactorily, as these give him poorer vision than the plano-convex lenses.

In closing the discussion, Dr. Jackson said the field of vision should be developed early in life; but we should not operate until the child is 1 or 2 years old. He said this boy is keeping up with his class in school even under these difficulties.

Extreme Conical Cornea.

Dr. JACKSON presented a young man, age 20, who had good sight until 8 or 9 years old. Then, after severe pneumonia, his vision failed. He was wearing lenses that gave vision R. 0.3 and L. 0.003. In the right eye, + 2. Sph. ⊂ —7.50 Cyl. ax. 80°. V. = 1.1. With the left eye, —30. Sph. gave V. =0.04. The curvature of the central part of this cornea was fairly spherical, corresponding to 80 D. of refraction or over. The anterior chambers were both very deep, and the left cornea somewhat nebulous. This patient has a sister whose vision had failed after illness at the age of 18. Her left eye showed extreme conicity of the cornea. For her right eye, she wore a —7. Cyl. ax 70°, or within 10° of that required for her brother's eye.

DISCUSSION.—Dr. J. A. Patterson asked if there is any myopia in the family, to which Dr. Jackson replied in the negative. The myopia, he stated, followed acute illness. In reply to Dr. McCaw's inquiry concerning the tension, he stated the tension had been normal with the fingers, and it could not be taken with the tonometer on account of the high corneal curvature.

Dr. O. Orendorff inquired about debilitating illness prior to the development of conical cornea. He stated that he had had three cases of conical cornea in the past year: One was a ranchman without previous illness; the second, a hotel proprietor, whose general health is absolutely perfect with no history of previous illness; and, the third case is that of a robust girl, without any history of previous illness. She has had slight myopic astigmatism, but has not been subjected to eye strain which would make this increase to the point where she should develop conical cornea.

Dr. F. R. Spencer mentioned a young man of 18 or 19, a university student, whom he had under observation 9 or 10 years ago, and in whom the conical cornea in each eye followed typhoid fever. He has had, during the past year, under observation a young lady who has conical cornea of one eye which followed pneumonia.

Dr. Edward Jackson said most of these cases have disturbed nutrition, and that is the underlying cause of the projection of the cornea forward.

Chronic Uveitis with Opaque Nerve Fibers.

Dr. EDWARD JACKSON presented a boy of 13, whose eyes became painful and inflamed 14 months before. He was treated in a distant city, no cause for the inflammation being found, except disease of the tonsils, which were removed. His right eye presented a clear cornea, a gray iris, slightly greenish as compared with its fellow eye, many posterior synechia, and deposits in the area of the partly dilated pupil. The lens was clear, the vitreous chamber hazy. Around the optic disc was a narrow ring of white, which broadened out and down, extending a whole diameter from the disc. This region was hyperopic, 10 D. The white patch gave the appearance of opaque nerve fibers, showing no pigment at the edges, or in any part. In the choroid were found a few small, round spots of partial atrophy, one of which was slightly pigmented. There were still smaller dots, like those of "retinitis punctata albescens," and one light streak, such as may be left when a floating retina becomes reattached. At the extreme periphery of the fundus, in all directions was seen a grayish-white area without pigment, not much elevated. At one point below, retinal vessels passed on to it, but the retina was nowhere floating. Transillumination was good in all directions. Tension of the eyeball was 13 (14mm.). The left eye was normal in all respects; tension 10

(24mm.). During the two months he had been under observation, vision in the right eye had increased from perception of moving shadows to 0.01.

Discussion.—Dr. F. R. Spencer asked if this was a case of congenital coloboma, as he did not have an opportunity to examine this patient. Dr. J. A. Patterson asked about the relation between the acute tonsilitis and uveitis. Dr. Jackson replied that they were probably opaque nerve fibers. The uveal inflammation subsided after the tonsils were removed.

Optic Atrophy of Traumatic Origin.

Dr. F. R. Spencer presented Mr. J. O. K., first examined February 19, 1917. Age 40. He gave a history of having been run over by a wagon wheel when 8 years of age. He was rendered unconscious and remained so for two days. He had hemorrhage from the mouth, nose and ears. Since then his vision has gradually failed, so that at the present time V. O. D. is 6/30-1 and J. No. 7 at eight inches. V. O. S. 1/60 with peripheral field and not even J. No. 14. The anterior segment of each eye is practically normal, except that the left pupil reacts to light consensually only. The right reacts well to both light and accommodation. Examination of the fundi revealed very pale discs, especially over the temporal half with distinct edges and atrophic cupping. The left disc is very white. Fields are greatly contracted. Blood and spinal fluid Wassermann are both negative. The cerebro-spinal fluid showed no leucocytosis and its globulin test was also negative. A physical examination of the nose and throat has failed to reveal anything to account for his optic atrophy, and an X-ray examination of the sella, hypophysis, and accessory sinuses of the nose is also negative, but it does show the old basal fracture. His general health is perfect, except that he has suffered from nervous prostration during the past 2 or 3 years, but is much better now.

Diagnosis:—Primary optic atrophy of traumatic origin. This is almost complete in the left eye and partial in the right. V. O. D. August 2nd, 6/20 and V. O. S. 2/60.

Dscussion.—Dr. E. M. Marbourg spoke of seeing an artilleryman who had sustained a fracture at the apex of the orbit. He had hemorrhages and edema of the optic nerve head. An examination of the disc showed typical optic atrophy.

Dr. J. A. Patterson said many of these cases are due to an injury of the nerve by spicules of bone, and by hemorrhage, with pressure against the nerve fibres.

Dr. D. A. Strickler spoke of a man who was cleaning a boiler and was struck with a heavy iron rod. He sustained a fracture of and hemorrhage into the orbit. He also mentioned another case which became suddenly blind, following an injury.

Interstitial Keratitis.—A further report upon Dr. J. A. Patterson's case of interstitial keratitis, presented at the October meeting of this society, was as follows: This patient has received treatment both for tuberculosis and syphillis, with quite decided improvement, although he is not entirely well to date.

Dr. F. R. Spencer emphasized the importance of treating patients, when two diseases are present, for both diseases if we are to expect the best results.

Dislocation of Lens.

Dr. E. M. Marbourg reported a man whose vision failed 5 years ago. Five days ago he had recurrent attacks of pain with redness of the right eye, and the lower edge of the lens was slightly tilted forward and opaque. The pupil was dilated. Eserin contracted the pupil promptly. In 3 days he had another attack. The tension was 55 by the tonometer. Transillumination was negative. No foreign body could be found and the lens and iris were not tremulous.

Discussion.—Dr. C. E. Walker said the capsule in this case has given away in all probability, and openings to the canal of Schlemm are blocked at one point. He would remove the lens in

this case in order to reduce the increased tension.

Dr. F. R. Spencer said an X-ray should be taken to see if by any possibility there is a piece of steel lodged in the eye.

Dr. J. A. Patterson said Sweet has emphasized that the X-rays shouldn't be too penetrating if we expect to find a small foreign body in the eye. Too penetrating rays make us overlook a small foreign body.

FRANK R. SPENCER,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

October 15, 1917.

DR. PAUL GUILFORD, President, in the Chair.

Hereditary Upward Coloboma of Iris. Other Hereditary Conditions.

DR. CLARENCE LOEB stated that although coloboma of the iris could not be justly classed among the very rare ocular malformations, it was not seen so frequently by any one man as not to excite interest. When it was bilateral and unaccompanied by any other developmental lesions, it was of additional interest. But when the lesion had an atypical location and a definite hereditary history running through five generations could be obtained, it certainly became worthy of being put on record.

Miss Z., a graduate nurse, was referred to him in January, 1917, for examination. He found that she had a bilateral coloboma as shown in the drawing which he had made. In the right eye, the defect was much greater than in the left. The remaining portion of the iris started just above the horizontal meridian, temporal side, curved downward and then upward to a point on the nasal side, slightly above that on the temporal. By transillumination, and looking far to the side, the margins of the lens could be seen in the area where the iris was absent, but the ciliary body could not be seen. Moreover the fundus was absolutely normal.

In the left eye, the pupil was extended upward and temporaly by the coloboma almost to the periphery, in a position corresponding to about 2 o'clock. A thin edge of iris persisted at this location. In this eye also there was no lesion of the fundus.

The right eye was almost amaurotic, owing to a high degree of myopic astigmatism, while the vision in the left eye was quite good after correction of a small amount of myopic astigmatism.

The patient was a very intelligent woman and repeatedly assured the author that wherever the anomaly had appeared in her family, it had partaken of the same character as in her eyes, namely, blisteral, upwards, and more pronounced on the right than on the left. At the author's request, the patient obtained a detailed family history.

In this family there were instances of both direct and indirect heredity. Counting each affected parent and his children, whether affected or not, as a separate family, there were seven families containing 20 children, of whom 10, or 50 per cent, were affected. There were two families in which the parents were not affected and the children were likewise normal. Finally, there was a case of indirect heredity of one child through an unaffected mother.

In an investigation into the subject of hereditary diseases of the eye which the author made in 1908, he was able to collect the histories of 59 families of aniridia or coloboma of the iris. Out of 156 children, 116, or 74 per cent, were affected. This was a higher percentage than obtained in the family whose history he had just related. In addition, a search through the literature since 1908 had revealed other cases which were cited. If every affected parent was counted with his or her children as a separate family, there were 7 families showing a direct heredity. In these families, there were 22 children, of whom 12 were affected and 10 normal. In addition there was one family showing collateral heredity, 5 children; 2 affected and 3 not. He gave statistics of 10 families containing 30 children, of whom 19 were affected, and 11 not affected. If to these were

added the families and children in the case he reported, there was a total of 17 families containing 50 children, of whom 29 were affected. If the present number of families and children was added to the previous statistics, there were 76 families with a total of 206 children, of whom 70 per cent were affected.

It was thus seen that the anomalies of the iris were strongly dominant characteristics, tending to be inherited in about three-fourths of the children of a parent so affected. So far as the essayist knew, there had been no case recorded of the marriage of two parents with coloboma of the iris, consequently no statement could be made as to the effect of such a marriage upon the progeny. In cataract, however, the percentage was 60 per cent in the case of both parents affected, and 58 per cent in the case of only one, practically the same. In retinitis pigmentosa, the percentage was 50 per cent in the case of both parents affected, and 50.6 per cent in the case of only one, again practically the same. However, the number of families in both of these diseases where both parents were affected was so small that no definite judgment should be made.

Discussion.—Dr. Francis Lane said that one usually thinks of coloboma of iris in the region of the cleft. After the lenticular vesicle has been formed and is covered with ectodermic structure, and the flask secondary to the optic vesicle has been born, the mesoderm grows from a portion of the optic vesicle which forms the cornea before the anterior chamber is formed. In this mass of mesoderm there is a slit in the connective tissue which forms the pupillary membrane on one side and the cornea on the other. This takes place before the iris grows out from the root of the ciliary body; then it is in close contact with it if the fissure is closed, but if there is failure of the fissure to close, one can understand why there is coloboma in that region. If there is failure of the separation of mesoderm which grows out later from this root between the lens and cornea, one can understand why coloboma can be situated in any position.

Dr. Loeb, in closing, said the whole subject of the development of the coloboma of the iris, the choroid or optic nerve, has never been definitely accepted. Many theories have been advanced, but where one gets coloboma of the iris in five generations of the same general character, hereditary influence must play an unusually strong part in bringing about this form of developmental anomaly.

Management of Squint.

Dr. Robert von der Heydt read a paper on this subject, stating that from his observations on strabismus he would first exclude alternating squint; in which cases there was found good vision and fixation of each eye, but muscular imbalance of high degree, favoring alternating suppression of the images; also the well understood cases of squint in high hypermetropia where the accommodation necessary to overcome it brought with it an excessive convergence, and thus produced a periodic and later a permanent inward squint. These latter cases were promptly corrected by the early adjustment of correcting lenses to be worn constantly, thus correcting the refractive error, bringing about perfect fixation and fusion, therefore stereoscopic vision, and inhibiting the impending development of amblyopia in the converging eye.

It was the other kinds of squint that he wished to consider, the kinds that were less easily handled. The first three or four years of life present the critical period in which so much could be done to assist nature in establishing permanent ocular parallelism. This could only be accomplished by a thorough and early study of each case and its possibilities, based on a full understanding of the etiologic factors producing them.

About the more obscure cases it might be said in short that any factor present in one eye that retarded the development of fixation, or made it less accurate in that eye, as anisometropia, monocular high astigmatism, amblyopia or lowered visual perception in it

from any cause, would retard the development of fusion and make it impossible. The inability to learn fusion, because of the lowered fixation qualifications of one eye would not in itself necessarily give rise to a squint; it would only predispose. If, however, there was added thereto in the same pair of eyes a tendency to deviation from any cause, a muscle imbalance, the development of a strabismus was inevitable. Expressed in other words, the visual undervalue of one eye, plus a tendency toward deviation, would bring a squint. These cases were common, difficult to handle and, therefore, often neglected. Early attention was most important; delay favored the development of monocular vision, the one eye increasing its visual value by taking the work onto itself, the other learning more and more to suppress, with amblyopia ex anopsia gradually increasing the difference between the two eyes, until nothing more could be done to coax back the reduced visual acuity.

The first step in the proper handling of the case was to win the confidence of the child, so that a careful retinoscopy could be done under a cycloplegic. It was best to introduce the child to the darkroom at the time of the first visit and give a few flashes with the mirror which proceeding was, as a rule, sufficient to avoid future rebelliousness. When the retinoscope disclosed a sufficient refractive error to reduce visual acuity or hypermetropia calling for several diopters of accommodative effort, glasses should be given.

A period of sufficient length to enable the parents to teach the child the recognition of numerals was now allowed until the next visit. This was done whether glasses were given or not. This enabled one to make accurate records of the visual acuity of each eye, as on this factor was dependent the character of our efforts and by means of it we might measure progress in the management of the case.

The visual acuity of each eye with and without glasses, also how much that of the better could be reduced by a cycloplegic must constantly be borne in mind for the purpose of intelligently studying the squinting eye, its possibilities, and later the improvement in it. The use of atropin in the good eye to force the use of the mate was an old practice, and the author pleaded only for the recognition of its limitations and its application in the selected number of cases which could be modified by this method. Results could only be obtained if one really forced the use of the bad eye; and one could only do so if one succeeded in making it temporarily the better eye of the two, by the cycloplegic's action on its mate.

What good would it do, for instance, to thus lower the visual acuity of the good eye for a period of months or years, as was often done, if in spite of this blurring it still remained the one with best acuity? Therefore, the necessity of studying the visual acuity of both eyes under various conditions.

If atropinization of the good eye was sufficient to make it the secondary eye, he ordered its use according to the calendar in the following manner: for instance, beginning January 1st a drop twice daily for three weeks, then stop and come in the last week of February. Resume March 1st for three weeks and continue in a like manner. If advisable, he deprived the better eye of its correcting lens during the atropin period and substituted a smoked lens. This called for the use of cycloplegics about half of the time (or even a longer period could be adopted), and made it necessary for the patient to make only six visits per annum. Parents would persevere, as a rule, if one made it reasonably easy for them.

He had, in some cases, continued the use of the monocular cycloplegia beyond the sixth year and during school time ordered homatropin on Saturday and Sunday. If these methods could not be adopted owing to the lower visual value of the squinting eye, some method of occlusion might be tried. He used periodically a hollow black patch with adhesive strips, so arranged that there could be no peeking. A definite schedule was given to be rigidly enforced.

In a case of convergent squint, in high hypermetropia existing for one and one-half years with marked amblyopia, by the use of atropin in the fixing eye for several years, according to the calendar system outlined before, he had measurably raised the visual acuity of the squinting eye and finally brought about parallelism.

Perseverance and the adoption of a definite system, if the latter did not impose too many duties upon the parents, would lead to surprisingly favorable results in the many cases so often left to permanent strabismus.

Discussion.—Dr. Thomas Faith stated that the essayist began by speaking of fusion, but later spoke more of parallelism than anything else. There are many cases of squint that are corrected so far as parallelism is concerned, but the other two important things one ought to consider, namely, improvement in vision in the squinting eye and binocular vision are lost completely.

As to teaching children to recognize numerals, this can be done after a certain period, but in some of the cases that come early the ophthalmologist is obliged to try something else besides teaching numerals, in order to obtain a record of vision and be sure whether or not the patients are improving. He has tried some of Worth's ideas like every one else who is doing work of this kind. One idea that is particularly valuable is to remove the correcting lens from the fixing eye which is kept under atropin and compelling the patient to see with the squinting eye, and if possible ascertain the amount of vision in the two eyes with the idea of determining which is the working eye under the conditions. One thing to keep in mind is to get binocular vision if possible, and this can only be obtained even with the amblyoscope after the vision in the squinting eye has begun to improve.

Another thing: by the periodical use of atropin, if we can get the squint transferred from the squinting eye to the fixing eye, we are likely to succeed.

As to the use of the amblyoscope, he has used it with considerable satisfaction and had adopted an idea that Dr. Schwarz is responsible for, that is, having patients use an amblyoscope at home. He has supplied a number of amblyoscopes in that way, and after the patients were through with them, he has taken them back at a reduced price, and turned them over to other patients at the reduced price, so that one does not lose anything, and the patients' expense is small. The greatest trouble the ophthalmologist has is to teach parents to do what he wants them to do; and to get them to take an interest in the case, aside from simply having glasses fitted. In young children, of two or three years, the thing to do is first to put on correction, then make a sort of game each day for the youngsters in having them hunt out something in the house with the fixing eye occluded. It is surprising what interest children take in it if parents will teach them. The parents can find out what a child is particularly fond of, the playthings it is fond of, hide them, and compel the child with the fixed eye to find them. By measuring the distance the child is from an object when he recognizes it and names it, you can obtain an idea what amount of vision the child has.

He has tried to use the little balls that Worth uses, but has not succeeded very well with them because if the child knows exactly what he is looking for all the time, there is no way of determining whether he sees enough to distinguish the little round sphere, or whether he guesses at it.

He has had something occur in the last year which upsets completely some of the ideas of fusion and improvement of vision, and so on, in squint. He has had under observation for three years and a half, a child who came when four years of age, who has been using the amblyoscope and has developed parallelism, binocular vision and improved vision in the squinting eye to 20/40 or 20/30. The child was going along nicely, and was for some reason not seen for a year. When he came back, in spite of the fact that he had parallelism, the squinting eye had degenerated in vision to 20/180ths. Still the

eye is so perfectly straight that one cannot discern any squint, and at the time he had seen the child a year previously, he was able to fuse with the amblyoscope and further than that, with a test he showed binocular vision.

Dr. Leigh E. Schwarz stated that he has found in certain cases, that a patient can run to the opposite side of the amblyoscope from five to ten degrees and still maintain persistently a certain amount of squint. In one case he reduced the squint to seven degrees, which remained at this point, notwithstanding the fact the patient fused by means of the amblyoscope ten degrees on the opposite side. He thought that was rather remarkable and interesting.

He recalled the case of a patient, three and a half years old when first seen, whom he had under observation for three years. At the beginning the patient had 20/200 in one eye, and 20/70 plus in the other, and twelve months later the patient got 20/30 plus in one eye and 20/30 minus in the other and has that at present. This case shows what can be done in raising visual acuity.

Dr. Von der Heydt, in closing the discussion, stated that his object in bringing up the subject was to emphasize the duty of the ophthalmologist towards these children. It is not enough to refract them, give them glasses, and bless them on their way, but the squinting eye must be followed. How one can measure visual acuity in a young child when it does not know numbers, he could not see.

The child should be taught numerals, and the average child, two or three years old, could be taught numbers.

As to the use of the amblyoscope, he could not conceive of one being able to so interest a child of the age mentioned with pictures. One might show children pictures, and many children will see the canary bird in the amblyoscope with one eye and nothing with the other., Another child may see the bird cage with the one eye and hardly a bird with the other, and how one can so influence a patient so young to draw a bird into the cage more than a few times with a child two or three years old, he could not understand. He had never bought an amblyoscope and therefore he was quite neutral as to its value. The most promising type of cases were evidently those that have high astigmatism in one eye. He thought Dr. Faith tried to differentiate unnecessarily between the ability to develop fusion and parallelism. No doubt, they are two separate and distinct things. If we create parallelism, and fusion does not develop, there is nothing that can be done further, except to continue to develop the visual acuity of the bad eye by the methods he outlined in his paper.

The speaker recalled to mind another case of a child two and three-quarter years old, brought to him eight years ago with six and a half diopters of hypermetropia. The parents have refused to give the child glasses. He saw a picture in the papers of how this child had been wonderfully cured on State street recently. One could therefore see what becomes of these children, when they are neglected by their parents.

Sympathetic Ophthalmia and Other Forms of Uveitis.

Dr. E. V. L. Brown presented specimens of three cases of sympathetic uveitis seen in this clinic during the past year; one of which followed a trephining, another a rupture of the margin of the cornea after a spontaneous thinning and ectasia, and the last a penetrating injury. Cases of ordinary fibrinoplastic and suppurative uveitis were shown; also specimens of cases of tuberculosis of the choroid, discrete tubercles, gummata of the iris, and disseminated chorio-retinitis from acquired syphilis.

Device to Immobilize the Head and Lids.

Dr. E. R. Crossley stated that many forms of lid specula had been devised for controlling the eyelids during operative procedures on the eyeball, most of which depended upon the force of a spring of some character to retract the lids. All of these devices had their weakness in their frailty and the fact that the patient "can squeeze the eye-

ball itself" with the lids and actually throw the speculum out of the eye during operation.

With the ordinary forms of specula, the routine procedure before doing a cataract extraction, after placing the patient in position on the table, was to talk to him to get control and his confidence and attempt to exert a hypnotic influence on his mind. If he happens to be a good patient, the surgeon succeeds. If nervous and irritable, as most were, he might roll the head to one side at the critical moment, when the knife was through the anterior chamber, and interfere seriously with the incision or cause the operator to do serious damage to the eye with the knife, if he did not dexterously follow the movement of the head.

The most serious damage might come after the incision was completed and the anterior chamber was open. He might squeeze violently enough to throw out the lens and vitreous through the opening and lose the eye entirely. Then the patient was told that it was his own fault for he squeezed. This was not a true statement, for the act was largely involuntary on his part, and we, as operators knowing it to be such, were responsible and should take some positive means to control the patient so that such mishaps were impossible.

Undoubtedly this common accident had occurred to all who were doing an extensive amount of this kind of work.

In the presentation of this appliance for the immobilization of the head and eyelids during operations on the eyeball, the author offered a mechanical device that took complete control of the head and eyelids more efficiently than a trained assistant could possibly do.

With this head clamp and eyelid retractor, the operator could go to his operation with a feeling that no accident was going to occur to detract from his good results, and that he could positively assure his patient that he could not move and injure himself during the operation. This reassured his mind and inspired confidence in the operator, obtaining a perfect control of the situation that was impossible to obtain otherwise.

The apparatus consists of two parts, the base and the superstructure or framework carrying the lid hooks. It was described in detail and illustrated with four figures.

Discussion.—Dr. Edward F. Garraghan said that he had practical experience last spring with the use of the apparatus exhibited in a cataract extraction and was surprised to see how efficient it was. There was no movement of the head whatever. He thinks every hospital should have such an apparatus and try it out.

Dr. Thomas O. Edgar stated that he recently had the opportunity to use the instrument in connection with the extraction of a cataract. He had seen Dr. Crossley use it in a number of cases at the infirmary, and in all such instances it immobilized the head and lids and prevented squeezing of the eyeball. It would be wise to have a little preliminary practice in the adjustment of the apparatus with particular reference to the carrier for the lid specula, because in the instance in which he used it, the head was a little too low, so as to restrict somewhat one's working space. If attention is given to this, that feature will probably be overcome. The instrument should be especially valuable to those ophthalmologists who have not a regular and well trained assistant.

Dr. Oliver Tydings said it occurred to him that there was one defect in the instrument exhibited, and that was, the power to control the occipito-frontalis muscle. He could not conceive of any instrument, outside of the human hand, which could control the movement of this muscle in the use of a lid detractor. He asked Dr. Crossley in how many cases he had used it.

Dr. Crossley, in replying to the question as to the length of time he had used the instrument, stated that it had been used since last January. He did not know the exact number of cases in which it had been used. However, it had been used frequently and satisfactorily at the infirmary.

Major Worthington, Secretary.

American Journal of Ophthalmology

Series 3, Vol. 1, No. 1. January, 1918

PUBLISHED MONTHLY by the OPHTHALMIC PUBLISHING COMPANY

7 West Madison Street, Chicago, Ill.

All original papers, reports of society proceedings, correspondence and other scientific communications should be addressed to the Editor,

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EDITORIALS.

OUR NEW JOURNAL.

Among medical and ophthalmic journals this one is counted new. But when we look closely into its various features, there is very little that is really new about it. Its name was used fifty years ago, and has been in continuous use for thirty-three years. Every one of its departments may be found in other journals. Its typography and make-up are imitations of points judged best in the journals merged to form it, or in the standard literary magazines of the day. Its original papers will be by writers who have been contributing to the American literature of ophthalmology. Its review and abstract departments deal with the same world literature as was available to our predecessors, but which is now diminished and impoverished by war. In only one thing is the journal new. It is a movement toward wider and more effective cooperation among the ophthalmologists of the greatest nation speaking a single language and enjoying the opportunities of modern civilization.

Even cooperation is no new thing in ophthalmic journalism. It has been a matter of cooperation from the start. The writer, the editor, the publisher, and the reader are all necessary to make it worth while to begin or continue a journal. There has always been some cooperation between them. Each journal started has been designed to meet some opportunity and need for such cooperation; and to a certain extent each has succeeded in doing this. The passing of every one of the journals now merged will excite some regret on the part of readers, editors, and writers. Only when a larger, more general, more effective cooperation is brought about will such regrets be lost in the new satisfaction.

Some of the effects of this greater cooperation became immediately evident. The reduction in cost from $34.50 to $10.00 per year to each subscriber is one of them. The greatly increased number of American ophthalmologists who receive this better journalistic service is equally capable of statistical demonstration. The correspondingly larger circle of readers that each writer can count upon is an obvious gain; and advertisers who watch closely the results of their expenditures will be able to express their returns in cold figures.

But there are phases of this cooperation which secure benefits less immediately evident, yet in the end more lasting and important. In place of a lay publisher, or one or a few editors, supporting and controlling an ophthalmic journal, forty-four ophthalmologists have joined together to support this enterprise. It is thus assured that the journal will remain under the control of professional ideals and responsive to the wishes and general interests of the profession. Concentration of executive responsibility may be necessary. But the executive of a democracy, even when given vast power, remains responsive to the wishes of his constituents to an extent never seen in an autocratic or individual control. We can expect from the members of the Ophthalmic Publishing Company intelligent supervision, and loyalty to general professional interests, as well as reasonable emphasis on business efficiency that gives results.

A notable gain to the literature of ophthalmology should come from closer cooperation between writers and editors. Certainly the work of the editor could be lightened and turned in more important directions, if each writer would make himself familiar with the form adopted for the presentation of original papers in this one journal, and would prepare his manuscript in conformity with it. But in this journal a great gain will be the bringing to every writer a command of all the literature of ophthalmology bearing upon his subject. It will be a long time before even our present ideals regarding this matter can be fully realized. But we can safely promise that from the start, every one of our readers will have the advantages heretofore afforded by the Ophthalmic Year Book that have so impressed some of our contributors. The organization of the Ophthalmic Literature and Year Book contributors, extended and made more effective, is now a part of the editorial organization of the American Journal of Ophthalmology, and wider cooperation on the part of the profession must make its work more generally valuable.

The cooperation of writers, editors, and publishers for the benefit of readers is commonly and rightly assumed to be the primary object of journal organization. It is hoped that it will not be lost sight of at any time in the case of our journal. But it is a purpose that may be carried farther than has heretofore been done, and in new directions. We shall come back to discuss it at other times, but two points may be mentioned here.

In the selection of material for our pages it will be our endeavor to hold the interest of our readers; and to make and keep that interest broad. This will necessitate the introduction of papers that some professor of ophthalmology would call elementary, or some laboratory worker would dub unscientific. We shall devote space and illustrations to other papers that the practical worker may regard as theoretical or ultrascientific. Both sets of critics need to broaden their interests, before they can be ranked as all-around ophthalmologists.

The true interest of readers also demands the widest authorship of the papers published in the journal. Not only should the review department reflect all that is of importance in the ophthalmic literature of the world, but the original papers should express the experience and ideas of as large a number of contributors as possible. Every ophthalmologist who has taken his work seriously and gone through several years of active practice, has encountered cases that should be recorded; has had impressions and ideas that would be of value to many other workers in this field. The ideal condition would only be reached when every worker in ophthalmology contributed something to its literature. By readiness to accept the contributions of new writers, and to assist them to put their thought into brief, clear, language and strip it of what tends to obscure rather than explain it, the editorial staff may render its most valuable assistance to journal readers.

To the Ophthalmologists of America this American Journal of Ophthalmology comes not as an achievement,

but as a beginning—an opportunity. It is an opportunity for wider, closer, more serviceable cooperation. The benefits it will bring are still indefinite and lie in the future. But they are none the less real, and they will come to us as fast as we come to understand their value, and the conditions under which they can be secured.

E. J.

ADVERTISING.

The advertising pages of the modern magazine or newspaper have been the place where individual whim and exploitation could develop, unchecked by any consideration of cooperative benefit. But in this journal, just as certainly as in the reading pages, cooperation for mutual benefit will dominate the policy with regard to advertising. This benefit will not be mutual merely for advertisers and publishers. The subscribers, as having by far the largest interest and having first made the journal possible, will receive the largest consideration.

These aims will be borne steadily in mind. The things advertised will be things in which ophthalmologists are especially interested. Only strictly ethical advertisements will be admitted. Only such drugs will be advertised as conform to the requirements of the Council on Pharmacy and Chemistry of the American Medical Association. Along all lines only responsible firms and institutions, that can be relied on to make good their promises, will be admitted to these pages.

To understand what we mean, take the column headed "PRESCRIPTION OPTICIANS." Every ophthalmologist in active practice sometimes wishes to inform a patient where he can get his glasses properly ground and fitted, or repaired, in some distant city. The cards of those who are known to be competent and reliable will furnish a directory useful to many of our readers.

To secure such a directory we have not asked every optician who would like it to take all the space he was willing to pay for. But a rigid form and limit of space have been adopted, that will make the directory easy to consult. Letters have been written to three ophthalmologists of wide reputation in each of these cities, asking them to designate the opticians they can best recommend. As their replies come in, the optician who seems to have the most general respect and confidence of the profession is given the opportunity to place his card in this column.

During the first few months our pages will carry some advertisements taken over with the journals merged. But as time goes on our policy of classified advertising, of the highest interest and value to our readers, will be more completely worked out.

E. J.

RECURRING AND MASSIVE HEMORRHAGES IN THE VITREOUS

The paper on this subject printed elsewhere in this issue, brings up the clinical and practical aspects of a very important condition. While fortunately not very common, it has the importance that attaches to every pathologic condition that may end in blindness; and it is quite liable to be bilateral.

In view of this danger of blindness, that vitreous hemorrhage carries with it, the practical means of promoting absorption, and preventing blindness in the individual case, cannot fail to be of interest. But it may be doubted whether great progress will be made in this direction without a better understanding of the etiology of such hemorrhage, than has been at our command in the past. Most eyes that become permanently blind from this cause recover from one or more attacks, and only succumb to repeated hemorrhages and gradual reduction of recuperative power. If the later recurrences could be prevented by removing the underlying cause, the patient might in the end have useful or even unimpaired vision.

The paper referred to goes somewhat into the subject of etiology, but does not go into it exhaustively. Especially it does not indicate the amount or im-

portance of the recent literature connecting such hemorrhages with tuberculosis. In pulmonary tuberculosis hemorrhage is so important a symptom, that occurring within the eye without trauma or other obvious cause, it might well suggest a tuberculous origin. The stumbling block in such a path of investigation is the usual absence of marked signs of pulmonary involvement in such cases, causing the medical adviser to reject or not to think of tuberculosis as a possible cause.

But in the last two or three years a good many cases have been reported in which, without symptoms of phthisis, the evidence of tuberculosis in the patient has been pretty clearly worked out. Focal reactions of diminished vision, increased haziness and hyperemia, and even recurrences of hemorrhage after injection of tuberculin, have seemed to demonstrate the connection of the local process with tuberculosis. We are not justified in the assumption that all such intraocular hemorrhages are of tuberculous origin. Yet the character of the hemorrhage, the general conformity of the case to a certain type, pointing toward a specific cause, well set forth by Eales thirty-six years ago, and the satisfactory recovery of recently reported cases under tuberculin treatment, all indicate that many of these cases may be of this character.

At least the reported evidence is sufficient to justify a very careful investigation of this point in every case that is to be reported. It will also be especially helpful to have reports of cases which can be clearly traced to other causes, or in which tuberculosis is excluded by careful investigation. No one observer sees enough of these cases to pronounce a final judgment on their etiology. But if we build up a sound literature of such case reports, any student of it can draw therefrom valuable conclusions.

RECORDS OF VISUAL ACUITY.

It generally happens that those who are thoroughly accustomed to one way of doing a thing fail to notice the marked disadvantages of their method, and are slow to adopt something better. Some one unaccustomed to it can better point out how it might be improved. This applies to the usual method of designating visual acuity. Among the communications that have reached the *Journal* is one from the Deputy Commissioner of the New York Department of Labor, who writes:

"Claimants come before me with different degrees of loss of vision and I have to determine how much compensation they are entitled to. If they have lost 100 per cent of vision they are entitled to 128 weeks at two-thirds of their pay as compensation, and if they lose 50 per cent they are entitled to half of that, depending upon the percentage of loss of vision as the basis that I make my awards on for loss of vision.

Frequently I get reports from oculists whose distance of range is not always 20 feet. I understand that if percentage comes in as 20/20 that the man has 100 per cent of vision, perfect vision; 20/30, he has 66⅔ per cent of his vision, and has lost 33⅓ per cent; 20/40, he has 50 per cent of vision and has lost 50 per cent, and so on down to 20/200, which would give him 90 per cent loss of vision.

I understand this scale when it comes in to me on the 20 feet distance, but frequently oculists use a different range than 20 feet, and it is very confusing for me to decide what to agree to as loss of vision. I am writing this to you to request that you publish it in your paper so that the oculists may read it. My request is, that in filling out the reports that an oculist always state specifically the *percentage* of loss of vision that the patient has.

Thanking you in advance for extending this courtesy to me, I am,

Very truly yours,
W. A. Abbott,
Deputy Commissioner."

When Snellen proposed to record visual acuity by a fraction, he suggested that the denominator should al-

ways be in Roman numerals and the numerator in Arabic, thus $\frac{20}{xx}$, indicating that the vision had been taken at 20 feet. Other ranges have been adopted, and the usual range is often designated as 6 meters. Even when 20 feet is adhered to the Roman numerals are given up. The percentage basis has gradually come into almost universal use in statistical studies. Applied to records of visual acuity it is easier to read, easier to print, superior in all ways, except that we are not accustomed to the method. If the change made necessary the renumbering of our test-cards it would be an advantage, for they would be numbered more accurately. E. J.

BOOK NOTICES.

Foster, M. L., DIAGNOSIS FROM OCULAR SYMPTOMS. 8vo, pp. 490. Cloth Price $6.00. New York; Rebman and Company, 1917.

The correlation of ocular symptoms in this very readable book fills a place in ophthalmic literature, as the subject is treated very much as when the clinical diagnostician makes his examination. The patient states the symptoms or they are elucidated by the questions of the examiner and from the objective examination.

This is a book of symptoms. There is very little given as to history course, anatomy, pathology, sequelae, prognosis or treatment, and very little under differential diagnosis. It is not a text-book on disease, but it is a well-written symptomatology, and thus of value to the beginner, as the latter, together with the general practitioner, needs the other general guides for ophthalmic diagnosis. Hence the author may perhaps be excused for certain omissions such as fuller notes upon focal infection, or the question of the differential diagnosis between aural and ocular vertigo.

On page 304, there is a misstatement, for the X-ray will detect fragments of certain kinds of glass. See Sweet's article in "Ophthalmology," July, 1906, p. 592; also illustrated in the Reviewer's book, "Injuries of the Eye," p. 256.

The book is beautifully printed in large type and on a kind and color of paper that is optically the best. The index is quite complete. The author is to be thanked for this interesting and valuable contribution to ophthalmic literature. H. V. W.

Fuchs, E., TEXT-BOOK OF OPHTHALMOLOGY. Authorized translation from the Twelfth German Edition, with additions supplied by the author, and otherwise enlarged, by Alexander Duane. Fifth Edition, 1067 pages, with 462 illustrations. Philadelphia and London: J. B. Lippincott Company. Cloth. Price $7.00.

When we had the pleasure of reviewing the twelfth edition we emphasized the extraordinarily high number of editions of this famous book, that became necessary within the twenty years since its first appearance. It again brilliantly displayed the unceasing efforts of the author to secure for his work its preeminent place among the best books on ophthalmology. An entirely novel feature was the addition of a whole new part constituting a splendid introduction of 62 pages on the general physiology, pathology, and therapy of the eye. Since that time no new German edition has been issued and none is at present contemplated.

We therefore heartily hail the new American edition by Dr. Duane, which in several senses is a new work. For, as the translator states, Prof. Fuchs not only gave his permission for the insertion of very valuable additions by the translator, but also himself supplied notes of many additions and changes. Some radical changes in the arrangement of the text by the translator, with the approval of the author, will make

the book more serviceable as a work of reference: "The many pages of remarks, in fine print, which were massed as an appendix at the end of chapters of major divisions, and whose considerable value and interest was somewhat obscured by this arrangement, were split into shorter sections, each placed in direct juxtaposition to the portion of the text with which it was related. Some of the more important items in the fine print were transferred bodily to the text, also the descriptions of various operative methods previously scattered through other portions of the book to part V, on operations."

The section on the diagnosis of ocular paralyses has been entirely rewritten and numerous and important changes, necessitated by the progress of ophthalmology, have been made by the translator in all parts of the book. These are indicated by brackets and the initial D. Most important are the additions in the chapters on glaucoma, diseases of the retina, refraction, accommodation, and operations, and scattered through all parts of the book. To mention only a few, there are remarks on tuberculin and vaccine therapy, visual field and color tests, mapping of scotomata and the blind spot, extragenital gonococcus infection, inclusion blennorrhea, etiology of trachoma, etiology of iritis, sclerosis of the choroid, Elliot's summary of glaucoma theories, retinitis exudativa, angiomatosis retinae, and the newer operations, etc.

These changes, so largely made on his own responsibility, certainly will not serve to detract, as the translator modestly says, from the many excellencies of the book which, for 27 years, has remained a model of its kind. But they greatly enhance its value by imparting to it an unusual completeness, which deserves the highest praise and recommendation. The innovation of numbered paragraphs and the excellently arranged index greatly facilitate orientation.

The number of illustrations has been increased from 392 to 462. The external appearance, print and paper are excellent. C. Z.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES. For the Fiscal Year 1916. 421 pages, including Index. Washington Government Printing Office, 1916.

The ophthalmologist, as a rule, either does not have opportunity or occasion to delve in Government reports. Some of them, such as Public Health Service Reports, contain information of value to the practitioner. That of this year, on pages 33 to 38, gives a report of the trachoma work in the Appalachian mountains; shows that the establishment of small hospitals in known infected districts has proven the best method of eradication and prevention of trachoma. There are three trachoma hospitals in Kentucky, the Jackson, Hindman and the London Hospitals; two in West Virginia, the Welsh and Coeburn Hospitals, and one in Claiborne County, Tennessee; 328 public health talks have been given, 3,571 homes visited, 624 schools and 26,975 pupils examined. Of a grand total of 51,957 people examined, 3,666 were found to be suffering from trachoma. Twelve field clinics have been given, 122 operations done, 145 local physicians present at the clinics and instructed in the diagnosis and treatment of trachoma.

There is no doubt that trachoma has been increasing in the Appalachian mountains. The establishment of these little hospitals will no doubt prevent its further spread and reach it, especially among the children, where it is usually incipient and readily curable.

H. V. W.

Braum, Alfred, and Friesner, Isidore, THE LABYRINTH. With fifty figures in the text and thirty-four half tones on twenty-four plates. New York. Rebman Company, 141-145 West 35th St. Price $4.50.

The past few years has been most marked in the development of the relations of the structure contained in the temporal bone, i. e.: the hearing and the equilibrium apparatus to the

general organism, and with this is associated that afforded by a sense of sight and the eye muscles. No longer can the ear be clinically looked at as it was thirty or more years ago as purely a sense organ of hearing, whose diseases were practically limited to wax and pus in the ears, middle and internal ear deafness.

Really my last few years of study of the temporal bone organs has astounded me with their utmost complexity, especially in their relations to the cerebellum and cerebrum. Indeed these sense and equilibrium organs are so far more complex than is the eye and they are so related to the eye that it is well for the pure ophthalmologist to be informed concerning them.

While this book of Braun and Friesner is well up to the date of publication, yet since that time many more clinical facts have been evolved and the subject has been so exhaustively studied that we may look for further and more complex works upon the subject of the Labyrinth and its brain connections and even for the establishment of a separate specialty which may go under the name of "Oto-Neurology." Thus this well-written and understandable book is but a stepping stone in the progress of this new specialty. More particularly the large amount of work now being done by the Head Surgeons of America in the examinations of candidates for aviation in Army and Navy service makes this book a necessary guide for the explanation of the physiologic conditions we thereby encounter. In addition to this the work goes on to the pathology of the Labyrinth and the surgical operations rendered necessary for relief.

It is beautifully printed and well illustrated by plates drawn by the authors. H. V. W.

NEWS ITEMS.

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado.

As these columns go to press on the 30th of the month, contributors should send in their items before that date.

The following gentlemen have consented to supply the News Items Editor with the news from their respective sections: James A. Black, San Francisco; Marcus Feingold, New Orleans; Wm. F. Hardy, St. Louis; Geo. H. Kress, Los Angeles; W. Holbrook Lowell, Boston; Henry R. Skeel, New York City; Chas. P. Small, Chicago; Geo. M. Waldeck, Detroit; Oscar Wilkinson, Washington, D. C. It is desirable that this staff shall be enlarged until every city of importance in the United States shall be covered, as well as all foreign countries. Volunteers are therefore needed, and it is hoped that they will respond promptly to this call.

Dr. Frank Loring Sargeant died recently at his home in Victoria, Texas.

Dr. James Mills of Janesville, Wisconsin, recently jumped from a bridge and was drowned.

Dr. Wm. S. Yager, Nebraska City, has been appointed physician for the School of the Blind, to succeed Dr. Claude Watson, deceased.

Dr. John Green, Jr., has been appointed a member of the Trachoma Commission of the Southern Medical Association.

Drs. Roland McKenzie and Edwin B. Goodall, of the staff of the Massachusetts Charitable Eye and Ear Infirmary, have gone to Halifax to assist in the relief work.

A committee for relief work among those blinded in the recent disaster in Halifax has commenced work, more than 210 persons having been blinded through the explosion.

Dr. E. V. L. Brown, who has succeeded Dr. Casey Wood as head of the Ophthalmological Department in the University of Illinois, has made some radical changes in method of clinical instruction in the school.

The Faculty of Medicine, Buenos Aires, has named Dr. Enrique B. Demaria to succeed Prof. Lagleyze to the chair of clinical ophthalmology.

The Société Francaise d'Ophtalmologie will hold a meeting May, 1918. Dr. Terrien

will give a report on X-rays and Radium in Ophthalmology.

A new organization is proposed, to be formed of ex-interns of the Illinois Charitable Eye and Ear Infirmary, Chicago, and graduate interns of other recognized hospitals for the care of diseases of the eye, ear, nose and throat. For particulars regarding this new organization, ex-interns are requested to address Dr. Ralph H. Woods, La Salle, Ill.

Teaching fellowships are available in Medicine, Surgery, Nervous and Mental Diseases, and Ophthalmology and Oto-laryngology at the University of Minnesota. These fellowships cover courses of three years' training for specialists and carry with them stipends of $500, $750, and $1,000 in the three years successively.

There are about 2,000 practicing optometrists in Pennsylvania and 800 in Philadelphia. The State Board recently began examining the optometrists in Philadelphia. The examinations, which cover five subjects, are the first to be held under the new law to license men engaged in the practice of optometry, and are designed to eliminate the charlatan. The results of this examination showed that a number of applicants could neither read nor write English.

The Clinical Course and the Diagnosis of Trachoma is the title of an article in the American Medical Association Journal of December 1st, by M. H. Foster, Surgeon, U. S. Public Health Service, Boston. He divides the disease into two classes, "fulminating" and "slow." His ideas on the diagnosis and management of the disease are new. His illustrations are unusually fine and instructive. The author is to be congratulated upon giving us such a splendid paper on this very stubborn subject.

A new Calcutta Eye Hospital has been proposed. Its chief surgeon will be F. P. Maynard, F. R. C. S., Lieut.-Col. I. M. S., Professor of Ophthalmic Surgery, Medical College, Calcutta. The hospital will start with 162 beds. The building will be four stories in height and modern in construction in every particular. The site acquired for it faces on Halliday street, a new thoroughfare being driven through the crowded part of the town from north to south. It is next to the Tropical Medicine School and Hospital.

Opthalmologists throughout the country are urged to write their senators and congressmen to support the bill to be introduced in the coming session of Congress, which provides that the Medical Officers of the Army shall have the same rank as prevails in the Medical Corps of the Navy; that out of 10,000 medical officers in active service there shall be twenty-five major-generals, twenty-five brigadier-generals, four hundred colonels, eight hundred lieutenant-colonels, two thousand three hundred and fifty majors, thirty-two hundred captains, and thirty-two hundred first lieutenants; that medical officers shall be equal in rank and authority with officers of the line, and that these provisions shall apply both to the regular service and the Medical Reserve Corps.

WAR NOTES.

Major G. I. Hogue of Milwaukee, Medical Corps, U. S. N. G., is stationed at Camp MacArthur, Waco, Texas.

Lieut. C. A. Bahn of the Tulane University is the acting adjutant of the Base Hospital Unit at Fort Oglethorpe, Georgia.

Maj. Nelson M. Black, of the Wisconsin Committee on Prevention of Blindness, is serving on the Sub-Committee on Ophthalmology of the General Medical Board of the Council of National Defense.

Capt. William C. Finnoff of Denver, Colo., is one of the medical personnel of the Base Hospital, No. 29, which has been formally accepted by the War Department.

Lieut. James M. Shields, formerly of Colorado, has been stationed at the Base Hospital at Fort McHenry, Maryland, where he is in charge of the Eye, Ear, Nose and Throat ward.

The Johns Hopkins Hospital and the South Baltimore Eye, Ear and Throat Hospital have offered to take some of the men stationed at Fort McHenry and give them special training. The Hopkins has taken six men and the South Baltimore has asked for four.

Lieut. M. H. Post, Jr., of St. Louis, stationed at Fort Oglethorpe, Ga., suffered an attack of lobar pneumonia recently. The crisis was successfully passed, and we are pleased to note that Lieut. Post is at present recuperating in Florida.

Major George E. de Schweinitz of Philadelphia is on active military duty in France.

Major P. H. J. Farrell, who is stationed at Camp Travis, Texas, was at home on a short furlough recently, and while there read a paper before the Chicago Medical Society on "The Medical Officer with the National Army."

Boston's report on her ophthalmologists who are on war duty is as follows:

Capt. W. N. Souter is stationed at Fort Constitution, in New Hampshire.

Major Alexander Quackenboss, M. R. C., received his commission some time ago, but has not yet been assigned to duty.

Major Walter B. Lancaster is on active duty at Camp Devens, Ayer, Massachusetts.

Dr. L. W. Jessaman has been serving for some months with the Harvard Surgical Unit, in France.

Captain George S. Derby is serving in France with the Peter Bent Brigham Unit.

Lieut. Ralph Hatch is serving in France with the Massachusetts General Hospital Unit.

Dr. Robert G. Loring has gone to Halifax to assist in the relief work there.

The Massachusetts Charitable Eye and Ear Infirmary has for some months given up two of its rooms, for the use of the Government in testing men for the Aviation Corps.

The St. Louis Ophthalmic Conference, with a total membership of twelve, is proportionately well represented in the service with five members commissioned.

Capt. L. T. Post has been for some time in active service in France; Lieut. M. H. Post is at Fort Oglethorpe; Major Wm. H. Luedde is on active duty recruiting in Missouri; Capt. F. E. Woodruff is on duty at the Mt. Clemens, Mich., Aviation Camp; Capt. E. C. Spitze has been commissioned but as yet not assigned to duty.

Chicago ophthalmologists are well represented among those serving the Government. On active duty at the present time may be mentioned: Major Casey A. Wood, who, in addition to his work of superintending the ophthalmologic department at the base hospital in Camp Sherman, Chillicothe, Ohio, is conducting a class in French for the benefit of the soldiers who will soon go to France. Major William H. Wilder is at Camp Taylor, Louisville, Ky.; Capt. George F. Suker, at Camp Custer, Battle Creek, Mich.; Major Thomas Woodruff, who has been at Camp Grant, has recently been transferred to Fort Grebel, R. I.; Capt. Harry Gradle is at Camp Grant, Rockford, Ill.; Capt. E. K. Findlay, at Fort Snelling, Minn.; Capt. Geo. W. Woodwick, at Chicago.

The Chicago unit for the physical examination of candidates for the aviation section of the Officer's Signal Corps, U. S. A., is proud of the distinction it enjoys as the star unit of the country. From the time of the organization of the unit in the middle of last June up to the present time, over 3,300 applicants have been examined, not including many reexaminations. This is an average of over 110 a week. The unit is in charge of Capt. Francis Lane. Capt. Lane and Lieut. Charles P. Small conduct the ophthalmologic examinations and Lieut. A. A. Hayden has charge of the ear examinations.

The American Board for Ophthalmic Examinations has felt the effect of war conditions most seriously. Dr. Alexander Duane retired from the Board because of his duty in the Naval service. Of the present members, Major William H. Wilder is at Camp Taylor; Major Frank C. Todd, Camp Dodge; Major Walter B. Lancaster, Camp Devens; Major Edward C. Ellett, Camp Meade. In spite of this handicap and the delays entailed, the work will still be carried on.

Arnold Lawson, F. R. C. S., Eng., of the Departmental Committee on the Welfare of the Blind, writes: "An immense amount of careful, patient, and thorough work is revealed in this report, which is a most complete and thorough exposition of a complicated national problem. A cursory glance through its seventy odd pages shows this much, whilst it may be stated that there is not a paragraph which will not repay careful reading and thoughtful consideration. The various issues raised in the discussion of this large subject have each of them received ample attention by the division of the Report into twelve sections or heads followed by general summary and conclusion."

Reeducation of the Blind.—"From an administrative point of view as well as for the systematic collection of funds, it is highly important to centralize war relief appeals and executive methods of distribution under one national organization. The Government has demanded that all relief organizations be coordinated under the Red Cross control. Following this general plan of absorption and centralization, a new school for the superior reeducation of the blind was turned over to the board of directors by M. Eugène Brieux of the Académie Francaise and President of the French section of the fund. This school has been formally opened at 27 boulevard Victor Hugo, Neuilly, in a spacious building with extensive gardens, which was formerly a seminary for young ladies. The premises have been leased and thoroughly equipped for a school for the blind by Mrs. Kessler, and given over in the name of the Permanent Blind War Relief Fund to the French section. This fund has already guaranteed a pension of 1,200 francs a year for life to every soldier both blinded and seriously maimed, in addition to purchasing cottages for many of them. It has opened extensive workshops and supplied, at cost price, on credit, to every reeducated blind man. It has a knitting school. It sends every blinded man who has no private means, after his reeducation in no matter which school, to his country town, paying his rent for one year and furnishing him with the means to reestablish himself and earn his own living."—(Extract from Paris Letter in Medical Record of December 1, 1917.)

OPHTHALMIC LITERATURE.

Under this head continuing the "Index of Opththalmology" heretofore published in **Ophthalmic Literature** will be found the subjects of all published papers received during the last month, that bear to an important extent upon ophthalmology. The subject is indicated rather than the exact title given by the author. Where the original title has been in a foreign language it is translated into English. The journal in which the paper is published will indicate the language of the original.

The names of the different journals are indicated by abbreviations which generally correspond to those used by the **Index Medicus**, the **Journal of the American Medical Association**, and the **British Journal of Ophthalmology**. We will from time to time publish the list of ophthalmic journals, with the abbreviations used for each. Often a single letter discriminates between journals published in different languages. Thus "Arch. of Ophth." refers to the Archives of Ophthalmology, published in English; "Arch. d'Opht.," indicates the French Archives d'Ophtalmologie; "Arch. de Oftal." refers to the Archivos de Oftalmologia Hispano-Americanos, while "Arch. di Ottal." indicates the Italian Archivio di Ottalmologia.

In this index of the literature the different subjects are grouped under appropriate heads; so that all papers bearing on the same, or closely related subjects, will be found in one group. The succession of the groups is the same from month to month, and identical with that of the Digest of the Literature. Where a paper clearly refers to two subjects that belong in different groups, it will be noticed in both groups.

Each reference begins with the name of the author in heavyface type. This is followed by the subject of his paper. Then in brackets a number with (ill.) indicates the number of illustrations, or a number with (pl.) the number of plates illustrating the article, (col. pl.) indicates colored plates. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that the paper was read before some society and gave rise to a discussion which is published with it.

It is desired to notice every paper as soon as possible after it is published. Readers will confer a favor by sending titles they notice have been omitted, with journal and page of publication; and of their own papers, sending either a copy of the journal in which each appeared, or a reprint. These should be sent as soon as possible to 318 Majestic Building, Denver, Colorado.

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Beaumont, W. M. Spiral Fields of Vision and Neurasthenia. Abst. in Lancet, Oct. 20, p. 624.

Hurst, A. F. Spiral Fields of Vision in Hysteria. (2 ill.) Lancet, Nov. 17, p. 768.

Roelofs, C. O. Tests for Visual Acuity. Nedrl. Tijdschr. v. Geneesk, 1917, p. 836.

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THERAPEUTICS.

Novarsenobenzol by Intrarectal Route. Amer. Jour. Ophth. v. 34, p. 345.

Dijakow. Treatment of Ocular Affections with Mineral Baths. Arch. d'Opht. v. 35, p. 703.

Jocqs. Ocular Therapeutics. Clin. Opht. v. 22, p. 323.

Terson, A. Mercury Salicylarsinate in Ocular Disease. Paris Méd. v. 7, p. 282.

Wolffberg. Candiolin in Ocular Scrofula. Woch. f. Therap. u. Hyg. d. Auges, April, 1917. Clin. Opht. v. 22, p. 363.

OPERATIONS.

Bordley, J. Jr. Ophthalmic Surgery in War. Clin. Cong. Surg. N. Amer., 1917. Abst. Surg. Gynec. and Obstet. Dec. p. 727.

Crossley, E. R. Device to Immobilize Head and Eyelids in Operations on Eyeball. (2 ill.) Jour. Amer. Med. Assn., v. 69, p. 2103.

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Banos y Brena, F. Mechanical Optics. (4 ill.) Arch. de Oft. Hisp.-Amer., v. 17, p. 556.

Bourgeois, A. Notation of Astigmatism. Arch. d'Opht., v. 35, p. 641. Ophth. Lit., v. 7, p. 132.

Joynt, J. W. Functional Spasm of Accommodation. Brit. Jour. Ophth., v. 1, p. 780.

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Merriam, L. A. Eye Strain. West. Med. Rev., v. 22, p. 559.

Post, M. H. Change of Refraction After Diabetes. Amer. Jour. Ophth., v. 34, p. 329.

Terrien, F. Astigmatism and Contusion of Globe. Arch. d'Opht., v. 35, p. 689.

OCULAR MOVEMENTS.

Marin, M. Facial and Oculomotor Paralysis from Lead Poisoning. (Bibl.) Arch. de Oftal., Hisp.-Amer., v. 17, p. 635.

Neeper, E. R. Divergent Squint. Colo. Ophth. Soc., Oct. 13, 1917. Ophth. Rec., v. 26, p. 637.

Von der Heydt, R. Management of Squint. Ill. Med. Jour., v. 32, p. 404.

CONJUNCTIVA.

Foster, M. H. Clinical Course and Diagnosis of Trachoma. Jour. Amer. Med. Assn., v. 69, p. 1837.

Heckel, E. B. Monocular Gonorrheal Ophthalmia., Penn. Med. Jour., v. 21, p. 120.

Lundsgaard, K. K. Prophylaxis of Gonorrheal Ophthalmoblennorrhea. Ugesk. for Laeger, v. 79, pp. 1496, 1690.

Monaumi, C. Conjunctival Eosinophilia and Provoked Conjunctivitis. (Bibl., 1 col. pl.) Arch. di Ottal., v. 24, p. 199.

Morgano, P. Social Conditions and Trachoma; a War Problem. Arch. di Ottal., v. 24, p. 237.

Morrie, G. Prophylaxis of Blennorrhea Neonatorum. Ugesk. for Laeger, v. 79, p. 1655.

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